Public Input No. 197-NFPA 99-2015 [Global Input]

Replace all bulk system definitions found in section 3.3.19 and resident to NFPA 99 with system definitions from section 3.3.93 of NFPA 55 (2016 edition). Add extract tag to definitions taken from NFPA 55.

Statement of Problem and Substantiation for Public Input

This change keeps the system definitions consistent across the two standards, eliminates some discrepancies, and keeps the use of source valve as the end point of the supply system.

Submitter Information Verification

Submitter Full Name: KAREN KOENIG
Organization: CGA
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jun 15 15:15:48 EDT 2015

Committee Statement

Resolution: FR-602-NFPA 99-2015
Statement: To harmonize with terminology used in NFPA 55. The word stationary was added to clarify the requirements between stationary and portable systems. This enables us to eliminate duplicate requirements in 5.1.3.5.13 that applied to stationary microbulk systems.

Public Input No. 412-NFPA 99-2015 [Global Input]

Type your content here ...

Additional Proposed Changes

File Name	Description	Approved
99_re-organization_2_-_For_Public_Input_Proposal.docx	Word Document of proposed Chapter 6 reorganization.	
Copy_of_99_chapter_6_re-organization_document_2_-_For_Public_Input_Proposal.xlsx	Excel document of proposed Chapter 6 reorganization. Includes entire content of chapter. Each column is used to show the level of heading to give more of a true outline view. Allows you to more easily see the relation of headings and subheadings.	

Statement of Problem and Substantiation for Public Input

As requested by the Technical Correlating Committee, a Task Group of the Technical Committee on Electrical Systems was formed to review the overall organization of Chapter 6. The numbering system of the current document has become cumbersome and does not follow NFPA style guidelines for 99. Additionally, the TCC recommended that the Chapter follow more of a Risk-Based flow similar to that of Chapter 5. Additional goals of the proposed reorganization are to reduce the number of subheadings and duplications, while consolidating related requirements to make the Chapter more logical to users. Effort was made to ensure no requirement content was changed as part of the reorganization. The reorganization is intended to be purely editorial and not change any of the performance requirements of the chapter.

Submitter Information Verification

Submitter Full Name: CHRIS FINEN
Organization: EATON CORPORATION
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 10:22:46 EDT 2015

Committee Statement

Resolution: FR-1-NFPA 99-2015

Statement: As requested by the Correlating Committee, a Task Group of the Technical Committee on Electrical Systems was formed to review the overall organization of Chapter 6. The numbering system of the current document has become cumbersome and does not follow NFPA style guidelines for 99. Additionally, the CC recommended that the Chapter follow more of a Risk-Based flow similar to that of Chapter 5. Additional goals of the proposed reorganization are to reduce the number of subheadings and duplications, while consolidating related requirements to make the Chapter more logical to users. Effort was made to ensure no requirement content was changed as part of the reorganization. The reorganization is intended to be purely editorial and not change any of the performance requirements of the chapter.

Public Input No. 5-NFPA 99-2015 [Global Input]

Throughout standard remove references to the following and replace with the following:

(1) ANSI/AWS A5.8 and replace with AWS A5.8.

(2) ANSI/UL and replace with UL.

(3) Instrumentation, Systems, and Automation Society and replace with International Society of Automation.

(4) ANSI/ISA and replace with ISA.

(5) ANSI/ASME B16.50 and replace with ASME B16.50.

(6) ANSI/ASME PVHO-1 and replace with ASME PVHO-1.

(7) ASHRAE Handbook of Fundamentals and replace with ASHRAE Handbook - Fundamentals.

(8) American Society of Mechanical Engineers and replace with ASME International.

(9) SP 58 and replace with MSS SP 58.

(10) ANSI/IEC/ISO 80001-1-1 and replace with IEC 80001-1.

(11) ANSI/IEC/ISO 80001-2-5 and replace with IEC TR 80001-2-5.

(12) ANSI/IEEE and replace with IEEE.

(13) CGA C-7 Guide to the Preparation and Precautionary Labelling and Marking Gas Containers, 2011, and replace with CGA C-7 Guide to Classification and Labelling of Compressed Gases, 10th edition, 2013.

(14) CGA M-1 Guide for Medical Gas Installations at Consumer Sites, 2007 and replace with Standard for Medical Gas Installations at Health Care Facilities, 3rd edition, 2013.

(15) TIA/EIA 568-B Commerical Building Telecommunications Cabling Standard and TIA/EIA 606-A Administration Standard for Telecommunications Building Infrastructure and replace with TIA Wiring Standards, 2014.

Statement of Problem and Substantiation for Public Input

Recommended revisions to correlate with PI-6 and PI-7.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 6-NFPA 99-2015 [Section No. 2.3]	Referenced current SDO names, addresses, standard names, numbers, and editions.
Public Input No. 7-NFPA 99-2015 [Section No. D.1.2]	Referenced current SDO names, addresses, standard names, numbers, and editions.
Public Input No. 15-NFPA 99-2015 [Section No. D.2]	

Submitter Information Verification

Submitter Full Name: Aaron Adamczyk
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Sun Feb 08 23:57:13 EST 2015

Committee Statement

Resolution: FR-101-NFPA 99-2015
Statement: Referenced standards updates.

Public Input No. 60-NFPA 99-2015 [Global Input]

1 . Delete entire subsection 10.2.3.6(5) as follows:

~~(5) *Means are employed to ensure that additional devices or nonmedical equipment cannot be connected to the multiple outlet extension cord after leakage currents have been verified as safe.~~

2 . Delete corresponding Annex A material A.10.2.3.6(5) as follows:

~~A.10.2.3.6~~ **~~(5) Power taps used in conjunction with an isolated power system are not subject to this requirement.~~**

Additional Proposed Changes

File Name	Description	Approved
TIA_99-15-1.pdf	NFPA 99 TIA 15-1 Log No. 1104	

Statement of Problem and Substantiation for Public Input

NOTE: This public input originates from Tentative Interim Amendment No. 15-1 (Log 1104) issued by the Standards Council on August 14, 2014 and per the NFPA Regs., needs to be reconsidered by the Technical Committee for the next edition of the Document.
Submitter's Substantiation: The Technical Committee accepted a public comment (NFPA 99 HEA-MED A11 ROC; 99-307 Log #272 HEA-MED) which would have deleted 10.2.3.6 (5), but another public comment 99-308 Log #64 HEA-MED on that section was Accepted in Principal and resulted in adding annex material A.10.2.3.6 (5) to that section. (Both items reported in the NFPA 99 Report on Comments A2011.) NFPA, when compiling the revised version of the document, did not incorporate the first committee action and implemented the second action, without determining the position of the committee on this issue. Technical background: Both of the ROC proposals were based on the recognition that it is impractical to completely eliminate the use in hospitals of multiple outlet extension cords that allow clinicians and staff to plug and unplug devices as needed. The situation in the OR was adeptly explained in ROC 99-308 Log #64, "It is near impossible to plug all electrical devices used in an operating room to a wall receptacle. The cord length on equipment are not long enough to reach the wall and even if it did it would restrict safe movement around the OR table." The problem, however, exists not just in the OR. For example, it is often necessary to use three or more infusion pumps, in addition to other devices, on one patient in a patient room. There may not be an adequate number of outlets nearby and running multiple cords, perhaps with extension cords, can hamper access to the patient and present a trip hazard. Instead, having an appropriate quality and properly maintained multiple outlet extension cord mounted on an IV pole, allows a safe method of powering whatever number of IV pumps is needed for a patient. The Committee action to accept proposal 99-307 Log #272 would have allowed this type of use of multiple outlet extension cords and eliminated any need for further exceptions or annex material. Furthermore, the use of isolated power, currently mentioned in the annex material, does not address concerns related to touch (leakage) current values that are addressed in the main text to which the annex comment is attached. Isolated power does not limit equipment touch currents to values required within the main document.
Emergency Nature: Uncorrected, the present requirements pose an unreasonable burden on hospitals and clinicians and restricts safe access to patients not only in the operating room, but also in other patient care areas. Furthermore, as accrediting bodies, such as The Joint Commission (TJC) and the U.S. Centers for Medicare & Medicaid Services (CMMS) incorporate these requirements into their assessments and survey processes, it becomes increasingly difficult to reverse these decisions and facilities are forced to implement alternative practices that may be either unnecessarily expensive (e.g., renovations to increase outlet numbers and accessibility throughout the hospital) or less safe (e.g., use of more single outlet extension cords running greater distances to access multiple wall outlets). Hospitals have already approached ECRI Institute regarding this problem, and it is therefore not just a theoretical concern, but one which facilities are being forced to address now. This TIA would address at least three of the factors to be considered when assessing the emergency nature of a TIA proposal (REGULATIONS GOVERNING COMMITTEE PROJECTS, http://www.nfpa.org/assets/files /PDF/CodesStandards/Directory/RegsGovCommProjects_2012.pdf) (b) The document contains a conflict within the document or with another NFPA document. This factor applies, because, as discussed in the technical background above, the Annex reference to isolated power is not related to the associated main document text.
(d) The proposed TIA intends to offer to the public a benefit that would lessen a recognized (known) hazard or ameliorate a continuing dangerous condition or situation. Adherence to the requirements may hinder access to the patient and pose a trip hazard. (f) The proposed TIA intends to correct a circumstance in which the revised document has resulted in an adverse impact on a product or method that was inadvertently overlooked in the total revision process, or was without adequate technical (safety) justification for the action. As discussed above, the current situation is the result of NFPA procedures in place at the time (and since corrected) that allowed for decisions to be made based on a procedural mishap without addressing technical considerations.

Submitter Information Verification

Submitter Full Name: TC on HEA-MED
Organization: NFPA
Street Address:
City:
State:
Zip:
Submittal Date: Fri Apr 10 09:51:24 EDT 2015

Committee Statement

Resolution: FR-501-NFPA 99-2015

Statement: This revision reaffirms the revisions adopted under TIA 15-1 (attached for convenience).

Change "Multiple Outlet Connections" to "Relocatable Power Taps" for consistency with other ANSI documents.

The word "pole-" has been added because the most common relocatable power tap configuration is securely attached to an IV pole that in turn supplies power to several devices in proximity to the IV pole. This combination is frequently used in Operating Rooms and Catheterization Labs where wall mounted power outlets are mounted far away from the patient. Utilization of these pole-mounted Relocatable Power Taps avoids multiple long power cords from snaking across the floor to the wall periphery outlets, thereby minimizing trip hazards.

Item (1) was revised and annex material added to clarify permissible attachment methods.

Item (4) was modified to ensure that the attachment method remains secure.

A.10.2.3.6(2): The existing annex material was deleted. Since it is not known in advance where whole-body hyperthermia/hypothermia units will be used, this issue has no bearing on meeting the 75% ampacity requirement. The 75% ampacity requirement has generated lots of confusion in the field as to how to comply. Suggested revised text may alleviate some of that confusion.

A.10.2.3.6(4) The existing annex material is irrelevant to the section to which it is attached and has therefore been deleted.

Public Input No. 61-NFPA 99-2015 [Global Input]

1 . Revise text to read as follows:

11.5.1.1 Elimination of Sources of Ignition.

11.5.1.1.1 Smoking materials (e.g., matches, cigarettes, lighters, lighter fluid, tobacco in any form) shall be removed from patients receiving respiratory therapy.

11.5.1.1.2* When a nasal cannula and its associated supply tubing are delivering oxygen outside of a patient care room, no sources of open flame shall be permitted in the site of intentional expulsion.

~~.~~ **11.5.1.1.3~~2~~*** When any other oxygen delivery equipment not specified in 11.5.1.1.2 is in use, ~~N~~ no sources of open flame, ~~including candles,~~ shall be permitted in the area of administration.

11.5.1.1.4* Solid fuel-burning appliances shall not be permitted in the area of administration.

11.5.1.1.~~3~~5* Sparking toys shall not be permitted in any patient care room.

11.5.1.1.~~4~~6 ~~-~~Nonmedical appliances that have hot surfaces or sparking mechanisms shall not be permitted within oxygen-delivery equipment or within the site of intentional expulsion.

A.11.5.1.1.2 O u tside of a patient care room, 11.5.1.1.2 prohibits sources of open flames within the site of intentional expulsion [1 ft (0.3 m)] of a nasal cannula. No sources of open flame are permitted within the area of administration [15 ft (4.3 m)] for other types of oxygen delivery equipment or in patient care rooms (see 11.5.1.1.3).

The amount of oxygen delivered by a nasal cannula is limited. One (1) ft (0.3 m) is sufficient separation from an oxygen- enriched atmosphere produced by a nasal cannula which is an oxygen delivery equipment used outside of patient care areas. In the open air, dilution goes to ambient levels (not oxygen-enriched atmosphere) within a few inches of the cannula openings, but

12 in. (300 mm) provides an adequate safety factor. Other oxygen delivery equipment such as masks, are not included since masks would not typically be associated with mobile patients in health care facilities and may deliver greater quantities of oxygen than nasal cannula.

The household-style nursing homes that include kitchens intended for residents' use and enclosed gas fireplaces present a source of flame ignition to which residents will be exposed. Residents utilizing a nasal cannula would potentially not be allowed to participate in the cooking because it would place the cooking flame within the site of intentional expulsion. However, they

would be allowed in the kitchen area to assist in preparing the food and to socialize with other residents and staff in the kitchen similar to what happens in the kitchens of residential environments.

The primary concern is that flame-producing equipment exists in many places in a nursing home and that it would be impractical to maintain a resident with a nasal cannula a minimum of 15 ft (4.3 m) (Area of Administration) away from the flame-producing equipment. Typical flame-producing equipment found in a nursing home includes the following:

1. Candles in chapels
2. Open kitchens using gas cooking equipment
3. Fireplaces
4. Fuel-fired heating equipment
5. Private family dining rooms using fuel-fired equipment
6. Canned cooking fuel (e.g., used under chafing dishes)

A.11.5.1.1.~~2~~ 3 Patients and hospital personnel in the area of administration should be advised of respiratory therapy hazards and regulations.

Visitors should be cautioned of these hazards through the prominent posting of signs. *(See 11.3.4.)*

A.11.5.1.1.4 Solid fuel–burning appliances include wood-burning fireplaces, wood stoves, and similar appliances. These pose a greater risk in locations where oxygen is being provided than gas-fueled appliances, in part due to their ability to emit embers into the environment.

A.11.5.1.1.~~3~~5 ~~-~~Such toys have been associated with fire incidents in health care facilities.

A suggested text for precautionary signs for oxygen tent canopies and oxygen hoods used in pediatric nursing units is the following:

CAUTION: OXYGEN IN USE ONLY TOYS APPROVED BY
NURSES MAY BE GIVEN TO CHILD

Additional Proposed Changes

File Name	Description	Approved
TIA_99-15-2.pdf	NFPA 99 TIA 15-2 Log No. 1125	

Statement of Problem and Substantiation for Public Input

A Public Input has been created for the Issued TIA No. 15-2. This TIA was issued on AUGUST 14, 2014. Per the NFPA Regs., all issued TIAs must be reconsidered by the Technical Committee for the Next Edition of the Document.
Submitters' Substantiation: The proposed TIA will address potentially restrictive interpretations for the presence of open flames in the vicinity of nasal cannula oxygen delivery equipment. The area of administration is defined as any point within a room within 15 ft of oxygen equipment or an enclosure containing or intended to contain an oxygen- enriched atmosphere. Section 11.5.1.1.2 prohibits sources of open flame, including candles, in the area of administration. A nasal cannula is considered as oxygen delivery equipment (ODE). Thus, with the current code, a resident with a nasal cannula could be prohibited from being within 15 ft of an open flame.

A site of intentional expulsion is defined as all points within 1 ft of a point at which an oxygen-enriched atmosphere is intentionally vented to the atmosphere. For example, for a patient receiving oxygen via a nasal cannula, the site of intentional expulsion normally surrounds the cannula.

This TIA proposes to revise Section 11.5.1.1.2 to prohibit sources of open flames within the site of intentional expulsion of a nasal cannula. One (1) ft is sufficient separation from an oxygen-enriched atmosphere produced by a nasal cannula, which is an oxygen delivery equipment used outside of patient care rooms. Current text in NFPA 99-2012 Edition (i.e., the fifth paragraph in Section A.10.5.4.5) states that in the open air, dilution goes to ambient levels (not oxygen enriched atmosphere) within a few inches of the venting port, but 12 inches provides an adequate safety factor. The proposed revision is consistent with the boundary limit for other sources of ignition, such as electrical equipment, which are prohibited to be used within the site of intentional expulsion (10.5.4.1). Other oxygen delivery equipment such as masks are not included knowing that masks would not typically be associated with mobile patients in health care facilities and may deliver greater quantities of oxygen.

It is estimated that at least 25% of residents in nursing homes need portable oxygen. The main focus of this proposed TIA is the site of intentional expulsion around the cannula. The traditional institutional design for nursing homes has the traditional sources of electrical, hot surfaces and flame sources of ignitions. The new "cultural change facilities" (household units) are allowed in the Life Safety Code-2012 Edition and are being actively promoted by the Centers for Medicare & Medicaid Services (CMS) and providers. CMS has allowed the permissive requirements for open kitchens and enclosed gas fireplaces in the Life Safety Code-2012 Edition until CMS adopts the Life Safety Code-2012 Edition. These are small units of 10-30 beds, with most being 10-16 beds and built with a residential open interior to include kitchens or fireplaces similar to private residences.

The household style nursing homes that include kitchens intended for residents' use and enclosed gas fireplaces present a source of flame ignition to which residents will be exposed. Residents on oxygen would potentially not be allowed to participate in the cooking because it would place the cooking flame within the site of intentional expulsion. However; they would be allowed in the kitchen area to assist in preparing the food and to socialize with other residents and staff in the kitchen just like what happens in the kitchens of residential environments.

The primary concern is that flame producing equipment exists in many places in a nursing home and that it would be impractical to maintain a resident with a nasal cannula a minimum of 15 ft (Area of Administration) away from the flame producing equipment. Typical flame producing equipment found in nursing homes includes the following:

1. Open kitchens using gas cooking equipment
2. Fireplaces
3. Candles in chapels
4. Fuel fired heating equipment
5. Private family dining rooms using fuel fired equipment
6. Canned cooking fuel (e.g., used under chafing dishes)

Emergency Nature: The proposed TIA intends to correct a circumstance in which the revised document has resulted in an adverse impact on a product or method that was inadvertently overlooked in the total revision process, or was without adequate technical (safety) justification for the action.

The household unit concept has been actively promoted and this concept has been incorporated into the Life Safety Code-2012 Edition to allow features such as kitchens and fireplaces with safeguards. In addition, the International Code Council (ICC) has approved similar changes for the 2015 editions of the ICC Codes. The 15-ft prohibition of open flames has not been widely enforced by code officials nationwide as applying to areas of administration such as the area around a nasal cannula. Enforcement of the 15-ft limit could lead to a CMS "immediate jeopardy" deficiency which includes an automatic fine and other penalties such as a restriction on the admission of new residents, and could have the effect of adversely affecting the benefits of socialization by residents who utilize portable oxygen.

CMS has announced that they plan to adopt the Life Safety Code-2012 Edition in the near future, which includes the NFPA 99-2012 Edition. CMS regulates all health care facilities in the United States and has stated that TIA's issued by NFPA prior to CMS final adoption of the Life Safety Code-2012 Edition will be considered part of the Code. Therefore, adoption of the TIA prior to CMS adoption of the Life Safety Code-2012 Edition is critical for the application of the criteria to facilities regulated by CMS.

Submitter Information Verification

Submitter Full Name: TC on HEA-MED
Organization: NFPA
Street Address:
City:
State:
Zip:

Submittal Date: Fri Apr 10 10:24:05 EDT 2015

Committee Statement

Resolution: FR-516-NFPA 99-2015

Statement: This revision reaffirms the revisions incorporated under TIA 15-2 (attached for convenience).

The use of the term "patient care space" was used for consistency.

Public Input No. 237-NFPA 99-2015 [Section No. 1.1.12]

1.1.12* Hyperbaric Facilities.

Chapter 14 ~~covers the recognition of, and protection against, hazards of an electrical, explosive, or implosive nature, as well as fire~~ establishes criteria for design of hyperbaric chambers and design and operation of hyperbaric facilities. Chapter 14 covers electrical, fire, pressure, and gas hazards associated with hyperbaric ~~chambers and associated~~ facilities that are used, or intended to be used, for medical ~~applications~~ and experimental procedures at gauge pressures from 0 kPa to 690 kPa (0 psi to 100 psi).

Statement of Problem and Substantiation for Public Input

One of the proposed edits specifies that the hyperbaric facilities chapter is used for facility design, chamber design, and facility operation. The other edits make the existing paragraph more concise.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 238-NFPA 99-2015 [Section No. A.1.1.12]	

Submitter Information Verification

Submitter Full Name: ROBERT SHEFFIELD
Organization: INTERNATIONAL ATMO INC
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 23 21:32:51 EDT 2015

Committee Statement

Resolution: FR-103-NFPA 99-2015
Statement: This revision specifies that the hyperbaric facilities chapter is used for facility design, chamber design, and facility operation. The section has been further revised to make the existing paragraph more concise.

The annex material is out of date and required revision. When last edited, this material was located in the hyperbaric facilities chapter and served as a preamble to the chapter's requirements. The material is out of context now that it is located in Chapter 1.

Public Input No. 27-NFPA 99-2015 [New Section after 1.6.2]

1.6.3 Special inspections.

1.6.3.1Special inspections of engineered design medical gas systems shall be conducted in accordance with Sections 1.6.3.2 and 1.6.3.3.

1.6.3.2 Periodic inspection. The registered design professional, AHJ or designee shall periodically inspect and observe the engineered design to determine that the installation is in accordance with the approved construction documents. All discrepancies shall be brought to the immediate attention of the plumbing contractor for correction. Records shall be kept of all inspections.

1.6.3.3 Written report. The registered design professional shall submit a final report in writing to the code official upon completion of the installation, certifying that the engineered design conforms to the approved construction documents. A notice of approval for the plumbing system shall not be issued until a written certification has been submitted.

Statement of Problem and Substantiation for Public Input

By adding the Special Inspections definitions would be consistent with NFPA 1, 101 and 5000 sections 3.3.258 Special Inspections. Adding this to NFPA 99 will address a definition that is being used by City and County officials. The Special Inspector tends to be one of three individuals, AHJ, Engineer, or a Third Party hired by the Owner or GC. We wish to provide some sort of a description to best capture these individuals.

Submitter Information Verification

Submitter Full Name: John Gregory
Organization: HDR Architecture Inc.
Affilliation: P.I.P.E. Medical Gas Committee Phoenix AZ
Street Address:
City:
State:
Zip:
Submittal Date: Wed Apr 08 12:07:09 EDT 2015

Committee Statement

Resolution: This information is specific to medical gas systems and if the HEA-PIP committee feels it is necessary, then this information should be located in that chapter.

Public Input No. 30-NFPA 99-2015 [Section No. 1.6.2]

1.6.2 Enforcement.

This code shall be administered and enforced by the authority having jurisdiction, if a designee is appointed, they shall be appointed by the AHJ, or RDPRC . *(See Annex C for a sample wording for enabling legislation.)*

Statement of Problem and Substantiation for Public Input

gives the RDPRC (engineer of record) more control over their design.

Submitter Information Verification

Submitter Full Name: John Gregory
Organization: HDR Architecture Inc.
Affilliation: P.I.P.E. Medical Gas Committee Phoenix AZ
Street Address:
City:
State:
Zip:
Submittal Date: Wed Apr 08 12:38:18 EDT 2015

Committee Statement

Resolution: This information is specific to medical gas systems and if the HEA-PIP committee feels it is necessary, then this information should be located in that chapter. The current language already allows the AHJ to appoint a designee in any case.

Public Input No. 6-NFPA 99-2015 [Section No. 2.3]

2.3 Other Publications.

2.3.1 ANSI Publications.

American National Standards Institute, Inc., 22 West 43rd Street, 4th Floor, New York, NY 10036.

ANSI ~~B57.1, *Compressed Gas Cylinder Valve Outlet and Inlet Connections* ANSI~~ Z136.3 **2** , *Safe Use of Optical Fiber Communication Systems Utilizing Laser Diode and LED Sources*, 2011.

ANSI/~~UL 723, *Standard for Test for Surface Burning Characteristics of Building Materials* , 2010.ANSI/~~ AAMI ES 60601–1, *Medical Electrical Equipment*, 2012.

~~ANSI/UL 1069, *Safety Standard for Hospital Signaling and Nurse Call Equipment* , 2012.~~

(Same IEC 60601-1)

2.3.2 ASHRAE Publications.

ASHRAE, 1791 Tullie Circle, NE, Atlanta, GA 30329-2305.

ASHRAE **STD** 90.1 **IP** , *Energy Standard for Buildings Except Low-Rise Residential Buildings*, ~~2010.ASHRAE 170~~ **2013, Errata, 2014** . **(Supersedes ASHRAE STD 90.1)**

ASHRAE **STD** 170 , *Ventilation of Health Care Facilities*, 2013.

2.3.3 ASME Publications.

~~American Society of Mechanical Engineers~~ **ASME International** , Two Park Avenue, New York, NY 10016-5990.

ASME A.17.1, *Safety Code for Elevators and Escalators*, ~~2010~~ 201 **3** .

ASME A.17.3, *Safety Code for Existing Elevators and Escalators*, 2011.

ASME B1.20.1, *Pipe Threads, General Purpose, Inch*, ~~2006~~ **2013** .

ASME B16.22, *Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings*, ~~2010~~ **2013** .

ASME B16.26, *Cast Copper Alloy Fittings for Flared Copper Tubes*, ~~2011~~ 201 **3** .

~~ANSI/~~ ASME B16.50, *Wrought Copper and Copper Alloy Braze-Joint Pressure Fittings*, ~~2008~~ **2013** .

ASME B31.3, ~~*Pressure* *Process Piping*, 2010~~ 201 **4** .

ASME B40.100, *Pressure Gauges and Gauge Attachments*, ~~2011~~ 201 **3** .

ASME Boiler and Pressure Vessel Code, Section VIII, Division 1, Rules for Construction of Power Boilers, 2015.

ASME Boiler and Pressure Vessel Code , ~~Sections VIII and~~ Section IX, ~~2010~~ Welding, Brazing, and Fusing, Qualifications, 2015 .

~~ANSI/~~ ASME PVHO-1, *Safety Standard for Pressure Vessels for Human Occupancy*, 2012.

2.3.4 ASSE Publications.

American Society of Sanitary Engineering, 901 Canterbury Road, Suite A, Westlake, OH 44145-1480.

ASSE 6010, *Professional Qualification Standard for Medical Gas Systems Installers*, 2012.

ASSE 6015, *Professional Qualification Standard for Bulk Medical Gas Systems Installer*, 2012.

ASSE 6030, *Professional Qualification Standard for Medical Gas Systems Verifiers*, 2012.

ASSE 6040, *Professional Qualification Standard for Medical Gas Maintenance Personnel*, 2012.

2.3.5 ASTM Publications.

ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959.

ASTM ~~A 269~~ A269 **/A269M** , *Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service*, ~~2010~~ 201 **4 e1** .

ASTM ~~A 312~~ A312 **/A312M** , *Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes*, ~~2013a~~ 201 **4b** .

ASTM ~~B 32~~ B32 , *Standard Specification for Solder Metal*, 2008**, Reapproved 2014** .

ASTM ~~B 88~~ B88 , *Standard Specification for Seamless Copper Water Tube*, ~~2009~~ **2014** .

ASTM ~~B 280~~ B280 , *Standard Specification for Seamless Copper Tubing for Air Conditioning and Refrigeration Field Service*, ~~2008~~ **2013** .

ASTM ~~B 819~~ B819 , *Standard Specification for Seamless Copper Tube for Medical Gas Systems*, 2000 ~~(~~ **, Reapproved 2011)** .

ASTM ~~B 828~~ B828 , *Standard Practice for Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings*, 2002 ~~(~~ **, Reapproved 2010)** .

ASTM ~~D 5~~ D5 **/D5M** , *Standard Test Method for Penetration of Bituminous Materials*, ~~2006 e1~~ **2013** .

ASTM ~~D 1785~~ D1785 , *Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120*, 2012.

ASTM ~~D 2466~~ D2466 , *Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40*, ~~2006~~ **2013** .

ASTM ~~D 2467~~ D2467 , *Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80*, ~~2006~~ **2013a** .

ASTM ~~D 2672~~ D2672 , *Standard Specification for Joints for IPS PVC Pipe Using Solvent Cement*, ~~1996a (2009)~~ **2014 .**

ASTM ~~D 2846~~ D2846 **/D2846M** , *Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Hot- and Cold-Water Distribution Systems*, ~~2009b e1~~ **2014** .

ASTM ~~D 2863~~ D2863 , *Standard Test Method for Measuring the Minimum Oxygen Concentration to Support Candle-Like Combustion of Plastics (Oxygen Index)*, ~~2012~~ 201 **3** .

ASTM ~~D 4359~~ D4359 , *Standard Test Method for Determining Whether a Material Is a Liquid or a Solid*, 2012.

ASTM ~~E 84~~ E84 , *Standard Test Method for Surface Burning Characteristics of Building Materials*, ~~2012c~~ **2015** .

ASTM ~~E 136~~ E136 , *Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C*, 2012.

ASTM ~~E 1352~~ E1352 , *Standard Test Method for Cigarette Ignition Resistance of Mock-Up Upholstered Furniture Assemblies*, 2008**a** .

ASTM ~~E 1353~~ E1353 , *Standard Test Methods for Cigarette Ignition Resistance of Components of Upholstered Furniture*, 2008**a e1** .

ASTM ~~E 1537~~ E1537 , *Standard Test Method for Fire Testing of Upholstered Furniture*, 2013.

ASTM ~~E 1590~~ E1590 , *Standard Test Method for the Fire Testing of Mattresses*, ~~2012~~ 201 **3** .

ASTM ~~E 2652~~ E2652 , *Standard Test Method for Behavior of Materials in a Tube Furnace with a Cone-shaped Airflow Stabilizer, at 750°C*, ~~2012~~ 201 **4a** .

ASTM ~~F 438~~ F438 , *Standard Specification for Socket-Type Chlorinated Poly (Vinyl Chlorinated) (CPVC) Plastic Pipe Fittings, Schedule 40*, 2009.

ASTM ~~F 439~~ F439 , *Standard Specification for Chlorinated Poly (Vinyl Chlorinated) (CPVC) Plastic Pipe Fittings, Schedule 80,* ~~2011~~ 201 **3** .

ASTM ~~F 441~~ F441 **/F441M** , *Standard Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe, Schedules 40 and 80,* ~~2009~~ **2013 e1** .

ASTM ~~F 493~~ F493 , *Solvent Cements for CPVC Pipe and Fittings*, ~~2010~~ 201 **4** .

2.3.6 AWS Publications.

American Welding Society, ~~550~~ **8669 NW** ~~LeJeune Road~~ **36 Street , #130, Miami, FL** ~~33126~~ **33166-6672** .

~~ANSI/~~ AWS **A5. 8M/** A5. 8, *Specification for Filler Metals for Brazing and Braze Welding*, 2011**, Addendum 1, 2014** .

AWS B2.2**/B2.2M** , *Standard for Brazing Procedure and Performance Qualification*, 2010.

2.3.7 BICSI Publications.

BICSI, 8610 Hidden River Parkway, Tampa, FL 33637-1000.

~~The BICSI~~ **BICSI ICT Terminology Handbook, V 1.0 (Download Only). (Supersedes BICSI's Information Transport Systems (ITS) Dictionary** ~~, 3rd edition.~~ **)**

2.3.8 CDA Publications.

Copper Development Association Inc., 260 Madison Avenue, New York, NY 10016.

Copper Tube Handbook, ~~2010~~ **2014** .

2.3.9 CGA Publications.

Compressed Gas Association, 14501 George Carter Way, Suite 103, Chantilly, VA 20151-2923.

CGA C-4, *Standard Method of Marking Portable Compressed Gas Containers to Identify the Material Contained* **(Superseded by CGA C-7)**

CGA C-7, *Guide to ~~the Preparation of Precautionary Labeling and Marking~~* **Classification and Labelling of Compressed** ~~Gas Containers, 2011~~ **Gases, 10th edition, 2014** .

CGA G-4, *Oxygen*, ~~2008~~ **2015** .

CGA G-4.1, *Cleaning Equipment for Oxygen Service*, 2009.

CGA G-6.1, *Standard for Insulated Carbon Dioxide Systems at Consumer Sites*, ~~2005~~ **7th edition, 2013** .

CGA G-6.5, *Standard for Small, Stationary, Insulated Carbon Dioxide Supply Systems*, ~~2007~~ **4th edition, 2013** .

CGA G-8.1, *Standard for Nitrous Oxide Systems at Consumer Sites*, ~~2007~~ **5th edition, 2013** .

CGA M-1,~~Guide~~ **Standard** *for Medical Gas Installations at ~~Consumer Sites~~* ~~, 2007~~ ***Health Care Facilites*** **, 3rd edition, 2013** .

CGA O2-DIR, *Directory of Cleaning Agents for Oxygen Service*, Edition 4.

CGA P-2.5, *Transfilling of High Pressure Gaseous Oxygen to Be Used for Respiration*, 2011.

CGA P-2.6, *Transfilling of Liquid Oxygen to Be Used for Respiration*, 2011.

CGA P-18, *Standard for Bulk Inert Gas Systems at Consumer Sites*, ~~2006~~ **4th edition, 2013** .

CGA V-1, ~~*Compressed Gas Association*~~ *Standard for Compressed Gas Cylinder Valve Outlet and Inlet Connections* ~~(ANSI B57.1), 2005~~ **, 13th edition, 2013** .

CGA V-5, *Diameter-Index Safety System (Noninterchangeable Low Pressure Connections for Medical Gas Applications)*, 2008.

2.3.10 CSA Publications.

Canadian Standards Association, ~~5060 Spectrum Way, Mississauga~~ **178 Rexdale Blvd, Toronto , ON,** ~~L4W 5N6~~ **M9W 1R3** , Canada.

CSA C22.2 No. 0.3, *Test Methods for Electrical Wires and Cables*, 2009**, Reaffirmed 2014** .

2.3.11 FGI Publications.

Facility Guidelines Institute, 1919 McKinney Avenue, Dallas, TX 75201.

Guidelines for Design and Construction of Hospitals and Outpatient Facilities, 2014.

2.3.12 IEC Publications.

International Electrotechnical Commission, 3, rue de Varembé, P.O. Box 131, CH-1211 Geneva 20, Switzerland.

IEC 60601-1, *Medical Electrical Equipment—Part 1: General Requirements for Basic Safety and Essential Performance*, ~~2007~~ **2014** .

2.3.13 ISA Publications.

~~Instrumentation, Systems, and Automation Society (ISA), 67 Alexander Drive, Research~~ **International Society of Automation** , 67 **T.W.** Alexander Drive, **P.O. Box 12207,** Research Triangle Park, NC 27709.

~~ANSI/~~ ISA ~~S~~ 7.0.01, *Quality Standard for Instrument Air*, 1996.

2.3.14 MSS Publications.

Manufacturer's Standardization Society ~~of the Valve and Fittings Industry , Inc.,~~ 127 Park Street NE, Vienna, VA 22180**-4602** .

MSS SP-58, *Pipe Hangers and Supports — Materials, Design, Manufacture, Selection, Application and Installation*, 2009.

2.3.15 TC Publications.

Transport Canada, 330 Sparks Street, Ottawa, ON, K1A ~~/~~ ON5, Canada.

Transportation of Dangerous Goods Regulations.

2.3.16 TIA Publications.

Telecommunications Industry Association, 2500 Wilson Boulevard, Suite 300, Arlington, VA 22201.

TIA ~~/EIA~~ **- 568-** ~~B~~ **C.1** , *Commercial Building Telecommunications Cabling Standard*, 2012. **(Supersedes TIA/EIA 568-B)**

TIA/EIA 606-A, *Administration Standard for Commercial Telecommunications Infrastructure*, 2009.

TIA Wiring Standards, 2014. (Supersedes and includes the 2 above referenced standards .)

2. 3.17 UL Publications.

Underwriters Laboratories Inc., 333 Pfingsten Road, Northbrook, IL 60062-2096.

UL 723, *Standard for Test for Surface Burning Characteristics of Building Materials*, 2008, Revised ~~2010~~ 201 **3** .

UL 1069, *Safety Standard for Hospital Signaling and Nurse Call Equipment* , **2007, Revised** 2012.

UL 1685, *Standard for Vertical-Tray Fire-Propagation and Smoke-Release Test for Electrical and Optical-Fiber Cables*, 2007, Revised 2010.

2.3.18 U.S. Government Publications.

Document Automation and Production Service (DAPS), Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094, www.dodssp.daps.mil.

21 USC 9, United States Food, Drug, and Cosmetic Act.

U.S. Government Commercial Standard 223-59, *Casters, Wheels, and Glides for Hospital Equipment*.

16 CFR 1632, *Standard for the Flammability of Mattresses and Mattress Pads (FF 4-72)*, 2000.

16 CFR Part 1633, *Standard for the Flammability (Open Flame) of Mattress Sets*, 2000.

2.3.19 Other Publications.

Merriam-Webster's Collegiate Dictionary, 11th edition, Merriam-Webster, Inc., Springfield, MA, 2003.

California Technical Bulletin 117, *Requirements, Test Procedure and Apparatus for Testing the Flame Retardance of Resilient Filling Materials Used in Upholstered Furniture,* 2000.

California Technical Bulletin 129, *Flammability Test Procedure for Mattresses for Use in Public Buildings,* 1992.

California Technical Bulletin 133, *Flammability Test Procedure for Seating Furniture for Use in Public Occupancies*, State of California, Department of Consumer Affairs, 3485 Orange Grove Avenue, North Highlands, CA 95660-5595.

Statement of Problem and Substantiation for Public Input

Referenced current SDO names, addresses, standard names, numbers, and editions.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 5-NFPA 99-2015 [Global Input]	
Public Input No. 7-NFPA 99-2015 [Section No. D.1.2]	
Public Input No. 15-NFPA 99-2015 [Section No. D.2]	

Submitter Information Verification

Submitter Full Name: Aaron Adamczyk
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Mon Feb 09 00:32:37 EST 2015

Committee Statement

Resolution: FR-101-NFPA 99-2015
Statement: Referenced standards updates.

Public Input No. 297-NFPA 99-2015 [Section No. 2.3.1]

2.3.1 ANSI Publications.

American National Standards Institute, Inc., 22 West 43rd Street, 4th Floor, New York, NY 10036.

ANSI B57.1, *Compressed Gas Cylinder Valve Outlet and Inlet Connections*

ANSI Z136.3, *Safe Use of Optical Fiber Communication Systems Utilizing Laser Diode and LED Sources*, 2011.

ANSI/~~UL 723, *Standard for Test for Surface Burning Characteristics of Building Materials* , 2010.ANSI/~~ AAMI ES 60601–1, *Medical Electrical Equipment*, 2012.

~~ANSI/UL 1069, *Safety Standard for Hospital Signaling and Nurse Call Equipment* , 2012.~~

Statement of Problem and Substantiation for Public Input

ANSI/UL 723 and ANSI/UL 1069 are UL Publications, and should be located in Section 2.3.17, not in the ANSI section.

Submitter Information Verification

Submitter Full Name: RONALD FARR
Organization: UL LLC
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jul 01 08:35:45 EDT 2015

Committee Statement

Resolution: FR-101-NFPA 99-2015
Statement: Referenced standards updates.

Public Input No. 41-NFPA 99-2015 [Section No. 2.3.4]

2.3.4 ASSE Publications.

American Society of Sanitary Engineering, 901 Canterbury Road, Suite A, Westlake, OH 44145-1480.

ASSE 6010, *Professional Qualification Standard for Medical Gas Systems Installers*, 2012.

ASSE 6015, *Professional Qualification Standard for Bulk Medical Gas Systems Installer*, 2012.

ASSE 6020, *Professional Qualifications Standard for Medical Gas Systems Inspectors* , 2012.

ASSE 6030, *Professional Qualification Standard for Medical Gas Systems Verifiers*, 2012.

ASSE 6040, *Professional Qualification Standard for Medical Gas Maintenance Personnel*, 2012.

Statement of Problem and Substantiation for Public Input

We exclude the medical gas inspector 6020 for what reason? The ASSE 6010 is required to inform a 6020 for each test they are to perform as stated in the Annex A they follow. They also have verbiage in the 6010 section 10-2.1.2 which speaks to a Job Inspector and the AHJ, this job inspector has no certification requirement? ASSE 6030 also references the 6020 under section 30-2.5 Documenting and Recording of Inspections and Tests 30-2.5.6.

Submitter Information Verification

Submitter Full Name: John Gregory
Organization: HDR Architecture Inc.
Affilliation: P.I.P.E. Medical Gas Committee Phoenix AZ
Street Address:
City:
State:
Zip:
Submittal Date: Thu Apr 09 12:46:55 EDT 2015

Committee Statement

Resolution: FR-101-NFPA 99-2015
Statement: Referenced standards updates.

Public Input No. 276-NFPA 99-2015 [Section No. 2.3.5]

2.3.5 ASTM Publications.

ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959.

ASTM A 269, *Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service*, 2010.

ASTM A 312, *Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes*, 2013a.

ASTM B 32, *Standard Specification for Solder Metal*, 2008.

ASTM B 88, *Standard Specification for Seamless Copper Water Tube*, 2009.

ASTM B 280, *Standard Specification for Seamless Copper Tubing for Air Conditioning and Refrigeration Field Service*, 2008.

ASTM B 819, *Standard Specification for Seamless Copper Tube for Medical Gas Systems*, 2000 (2011).

ASTM B 828, *Standard Practice for Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings*, 2002 (2010).

ASTM D 5, *Standard Test Method for Penetration of Bituminous Materials*, 2006 e1.

ASTM D 1785, *Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120*, 2012.

ASTM D 2466, *Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40*, 2006.

ASTM D 2467, *Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80*, 2006.

ASTM D 2672, *Standard Specification for Joints for IPS PVC Pipe Using Solvent Cement*, 1996a (2009).

ASTM D 2846, *Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Hot- and Cold-Water Distribution Systems,* 2009b e1.

ASTM D 2863, *Standard Test Method for Measuring the Minimum Oxygen Concentration to Support Candle-Like Combustion of Plastics (Oxygen Index)*, ~~2012~~ 2013 .

ASTM D 4359, *Standard Test Method for Determining Whether a Material Is a Liquid or a Solid*, 2012.

ASTM E 84, *Standard Test Method for Surface Burning Characteristics of Building Materials*, ~~2012c~~ 2015a .

ASTM E 136, *Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C*, 2012.

ASTM E 1352, *Standard Test Method for Cigarette Ignition Resistance of Mock-Up Upholstered Furniture Assemblies*, 2008.

ASTM E 1353, *Standard Test Methods for Cigarette Ignition Resistance of Components of Upholstered Furniture*, 2008.

ASTM E 1537, *Standard Test Method for Fire Testing of Upholstered Furniture*, 2013.

ASTM E 1590, *Standard Test Method for the Fire Testing of Mattresses*, ~~2012~~ 2013 .

ASTM E 2652, *Standard Test Method for Behavior of Materials in a Tube Furnace with a Cone-shaped Airflow Stabilizer, at 750°C*, 2012.

ASTM F 438, *Standard Specification for Socket-Type Chlorinated Poly (Vinyl Chlorinated) (CPVC) Plastic Pipe Fittings, Schedule 40*, 2009.

ASTM F 439, *Standard Specification for Chlorinated Poly (Vinyl Chlorinated) (CPVC) Plastic Pipe Fittings, Schedule 80,* 2011.

ASTM F 441, *Standard Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe, Schedules 40 and 80,* 2009.

ASTM F 493, *Solvent Cements for CPVC Pipe and Fittings,* 2010.

Statement of Problem and Substantiation for Public Input

date updates

Submitter Information Verification

Submitter Full Name: MARCELO HIRSCHLER
Organization: GBH INTERNATIONAL
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jun 29 21:19:14 EDT 2015

Committee Statement

Resolution: FR-101-NFPA 99-2015
Statement: Referenced standards updates.

Public Input No. 283-NFPA 99-2015 [Section No. 2.3.5]

2.3.5 ASTM Publications.

ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959.

ASTM A 269, *Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service*, 2010.

ASTM A 312, *Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes*, 2013a.

ASTM B 32, *Standard Specification for Solder Metal*, 2008.

ASTM B 88, *Standard Specification for Seamless Copper Water Tube*, 2009.

ASTM B 280, *Standard Specification for Seamless Copper Tubing for Air Conditioning and Refrigeration Field Service*, 2008.

ASTM B 819, *Standard Specification for Seamless Copper Tube for Medical Gas Systems*, 2000 (2011).

ASTM B 828, *Standard Practice for Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings*, 2002 (2010).

ASTM D 5, *Standard Test Method for Penetration of Bituminous Materials*, 2006 e1.

ASTM D 1785, *Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120*, 2012.

ASTM D 2466, *Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40*, 2006.

ASTM D 2467, *Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80*, 2006.

ASTM D 2672, *Standard Specification for Joints for IPS PVC Pipe Using Solvent Cement*, 1996a (2009).

ASTM D 2846, *Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Hot- and Cold-Water Distribution Systems,* 2009b e1.

ASTM D ~~2863, *Standard Test Method for Measuring the Minimum Oxygen Concentration to Support Candle-Like Combustion of Plastics (Oxygen Index)* , 2012.ASTM D~~ 4359, *Standard Test Method for Determining Whether a Material Is a Liquid or a Solid*, 2012.

ASTM E 84, *Standard Test Method for Surface Burning Characteristics of Building Materials*, 2012c.

ASTM E 136, *Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C*, 2012.

ASTM E 1352, *Standard Test Method for Cigarette Ignition Resistance of Mock-Up Upholstered Furniture Assemblies*, 2008.

ASTM E 1353, *Standard Test Methods for Cigarette Ignition Resistance of Components of Upholstered Furniture*, 2008.

ASTM E 1537, *Standard Test Method for Fire Testing of Upholstered Furniture*, 2013.

ASTM E 1590, *Standard Test Method for the Fire Testing of Mattresses*, 2012.

ASTM E 2652, *Standard Test Method for Behavior of Materials in a Tube Furnace with a Cone-shaped Airflow Stabilizer, at 750°C*, 2012.

ASTM F 438, *Standard Specification for Socket-Type Chlorinated Poly (Vinyl Chlorinated) (CPVC) Plastic Pipe Fittings, Schedule 40*, 2009.

ASTM F 439, *Standard Specification for Chlorinated Poly (Vinyl Chlorinated) (CPVC) Plastic Pipe Fittings, Schedule 80,* 2011.

ASTM F 441, *Standard Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe, Schedules 40 and 80,* 2009.

ASTM F 493, *Solvent Cements for CPVC Pipe and Fittings,* 2010.

Statement of Problem and Substantiation for Public Input

ASTM D2863 is not actually being referenced in NFPA 99.

Submitter Information Verification

Submitter Full Name: MARCELO HIRSCHLER
Organization: GBH INTERNATIONAL
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 30 08:36:49 EDT 2015

Committee Statement

Resolution: FR-101-NFPA 99-2015
Statement: Referenced standards updates.

Public Input No. 298-NFPA 99-2015 [Section No. 2.3.17]

2.3.17 UL Publications.

Underwriters Laboratories Inc., 333 Pfingsten Road, Northbrook, IL 60062-2096.

ANSI/ UL 723, *Standard for Test for Surface Burning Characteristics of Building Materials*, 2008, Revised ~~2010~~ 2013 .

UL 1685, *Standard for Vertical-Tray Fire-Propagation and Smoke-Release Test for Electrical and Optical-Fiber Cables*, 2007, Revised 2010.

ANSI/UL 1069, *Safety Standard for Hospital Signaling and Nurse Call Equipment* , 2007, Revised 2015 .

Statement of Problem and Substantiation for Public Input

ANSI/UL 1069 is a UL Publications, and should be located in Section 2.3.17, not in the ANSI section. Also updated editions of referenced UL Standards

Submitter Information Verification

Submitter Full Name: RONALD FARR
Organization: UL LLC
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jul 01 08:40:46 EDT 2015

Committee Statement

Resolution: FR-101-NFPA 99-2015
Statement: Referenced standards updates.

Public Input No. 196-NFPA 99-2015 [Section No. 3.3.19 [Excluding any Sub-Sections]]

An assembly of equipment for supplying compressed gas (consisting of, but not limited to, storage containers, pressure regulators, pressure relief devices, vaporizers, manifolds, and interconnecting piping) that terminates ~~where the gas, at service pressure, first enters the main line~~ the source valve . The storage containers are either stationary or movable and include unconnected reserves on hand at the site, and the source gas is stored as a compressed gas or cryogenic fluid.

Statement of Problem and Substantiation for Public Input

The 2005 edition of NFPA 99 provided a clear point of separation between the Bulk System and the Piped Distribution Network. This meant that when a new Bulk System was installed the bulk system installer could pipe up to the source valve. The approved changes to the 2015 edition of the 99 Code have now moved that point back to the system regulators. The definition of a Bulk System is now, “An assembly of equipment for supplying compressed gas (consisting of, but not limited to, storage containers, pressure regulators, pressure relief devices, vaporizers, manifolds, and interconnecting piping) that terminates where the gas, at service pressure, first enters the main line.

Submitter Information Verification

Submitter Full Name: KAREN KOENIG
Organization: CGA
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jun 15 15:13:09 EDT 2015

Committee Statement

Resolution: FR-602-NFPA 99-2015
Statement: To harmonize with terminology used in NFPA 55. The word stationary was added to clarify the requirements between stationary and portable systems. This enables us to eliminate duplicate requirements in 5.1.3.5.13 that applied to stationary microbulk systems.

Public Input No. 300-NFPA 99-2015 [New Section after 3.3.21]

3.3.21 Capture Device (Plume). The hose, tube, funnel or other accessory that provides the inlet to the plume evacuation system at the site of plume generation.

Statement of Problem and Substantiation for Public Input

The term (used in 9.3.8) is not defined.

Submitter Information Verification

Submitter Full Name: MARK ALLEN
Organization: BEACON MEDAES
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jul 01 12:53:25 EDT 2015

Committee Statement

Resolution: The term is not used in the body of document, and can be understood as common language. Concerns that there could be confusion in use are address elsewhere in the code, see A.5.1.14.1.4.

Public Input No. 112-NFPA 99-2015 [New Section after 3.3.22]

3.3.22 Central Supply System. The source of supply for a medical gas or vacuum system or a medical support gas system. Central supply systems comprise the equipment necessary to produce, condition, control and monitor the gases or vacuum. They include all equipment from the atmospheric intake on air compressors, exhaust on vacuum pumps, and cylinders or containers for pressurized gases through to the Source Valve (see 5.1.4.2). Examples of central supply systems include air compressor sources, vacuum pump sources, cylinder and container headers and manifolds, liquid bulk gas systems, proportioning systems and combinations of these.

Statement of Problem and Substantiation for Public Input

The term Central Supply systems is quite important in using Chapter 5, but it is never formally defined. The term central supply system is used as is the term "Supply Source" but the usage is not entirely consistent. The proposal attempts to improve this.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 114-NFPA 99-2015 [Section No. 5.1.3.3.1.1]	
Public Input No. 115-NFPA 99-2015 [Section No. 5.1.3.3.1.3]	
Public Input No. 116-NFPA 99-2015 [Section No. 5.1.3.3.1.4]	
Public Input No. 117-NFPA 99-2015 [Section No. 5.1.3.3.3.3]	
Public Input No. 118-NFPA 99-2015 [Section No. 5.1.3.5.7 [Excluding any Sub-Sections]]	
Public Input No. 119-NFPA 99-2015 [Section No. 5.1.3.5.9.1]	
Public Input No. 120-NFPA 99-2015 [Section No. 5.1.3.5.13]	
Public Input No. 121-NFPA 99-2015 [Section No. 5.1.3.5.14]	
Public Input No. 122-NFPA 99-2015 [Section No. 5.1.3.6]	
Public Input No. 123-NFPA 99-2015 [Section No. 5.1.3.6.3]	
Public Input No. 124-NFPA 99-2015 [Section No. 5.1.3.6.3.14]	
Public Input No. 125-NFPA 99-2015 [Section No. 5.1.3.7]	
Public Input No. 126-NFPA 99-2015 [Section No. 5.1.3.8]	
Public Input No. 127-NFPA 99-2015 [Section No. 5.1.4.2]	
Public Input No. 128-NFPA 99-2015 [Section No. 5.1.9.5.1]	
Public Input No. 129-NFPA 99-2015 [Section No. 5.1.9.5.3]	

Submitter Information Verification

Submitter Full Name: MARK ALLEN
Organization: BEACON MEDAES
Street Address:
City:
State:
Zip:
Submittal Date: Mon May 25 10:06:16 EDT 2015

Committee Statement

Resolution: FR-601-NFPA 99-2015
Statement: terminology

Public Input No. 284-NFPA 99-2015 [New Section after 3.3.22]

3.3.22* Clinical IT-Network

An information technology video, voice and data communication network which is dedicated for shared use by medical devices, nurse call, clinical information systems, patient critical applications, and clinical wireless communication equipment all of which are managed in accordance with a conforming risk management standard by the responsible organization.

A.3.3.2.2

A clinical IT-network comprises the servers, switches, routers and voice and data communications equipment which are employed to transport patient critical clinical data, information and staff communications over a shared interoperable IT network infrastructure.

Additional Proposed Changes

File Name	Description	Approved
NEMA_-_NFPA_99_Public_Input.docx	Full NEMA PI Proposal	

Statement of Problem and Substantiation for Public Input

As the clinical environment becomes more and more automated, integrated and evolved, there is a need for the NFPA 99 code to establish a framework of requirements for a shared interoperable clinical IT-network. Doing so will institute the necessary electrical safety and risk management provisions that can have direct benefit on patient and clinician safety. There is a need for the NFPA 99 code to establish and define the infrastructure requirements for a clinical IT-network, which is dedicated for use by clinicians and patients. Such a network comprises the servers, switches, routers (etc.) and voice and data communications equipment which are used to transport clinical data and information over a shared IT network infrastructure. Defining the requirements for a Clinical IT network in the NFPA 99 Code will ensure patient and staff safety, safe system operation, overall system effectiveness, and data and system security of personal information and clinical use data which can be transported on the clinical IT network.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 285-NFPA 99-2015 [Section No. 6.4.2.2.4.2]	
Public Input No. 288-NFPA 99-2015 [Section No. 7.3.3.5]	
Public Input No. 291-NFPA 99-2015 [Section No. 7.3.3.7]	
Public Input No. 292-NFPA 99-2015 [Section No. 7.4.3.5]	
Public Input No. 293-NFPA 99-2015 [Section No. 7.4.3.7]	

Submitter Information Verification

Submitter Full Name: VINCE BACLAWSKI
Organization: NEMA
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 30 10:48:09 EDT 2015

Committee Statement

Resolution: FR-39-NFPA 99-2015

Statement: As the clinical environment becomes more and more automated, integrated and evolved, there is a need for the NFPA 99 code to establish a framework of requirements for a shared interoperable clinical IT-network. Doing so will institute the necessary electrical safety and risk management provisions that can have direct benefit on patient and clinician safety. There is a need for the NFPA 99 code to establish and define the infrastructure requirements for a clinical IT-network, which is dedicated for use by clinicians and patients. Such a network comprises the servers, switches, routers (etc.) and voice and data communications equipment which are used to transport clinical data and information over a shared IT network infrastructure. Defining the requirements for a Clinical IT network in the NFPA 99 Code will ensure patient and staff safety, safe system operation, overall system effectiveness, and data and system security of personal information and clinical use data which can be transported on the clinical IT network.

Public Input No. 357-NFPA 99-2015 [Section No. 3.3.28]

~~3.3.28 – Critical Care Area.~~

~~A room or space in which failure of equipment or a system is likely to cause major injury or death to patients or caregivers (Category 1). (See 3.3.127 .)~~

Statement of Problem and Substantiation for Public Input

Definition for Critical Care Area or Space is no longer necessary and should be eliminated to avoid confusion of technical terms used in NFPA 99. The term has changed to reflect Category language. This term is now designated as shown in NFPA 99: 3.3.137 Patient Care Space designated as Category 1 Space. This definition and any references to the term "Critical Care Area" or "Critical Care Space" used through out NFPA 99 should be removed and/or changed to “Category 1 Space”.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 359-NFPA 99-2015 [Section No. 3.3.125]	
Public Input No. 363-NFPA 99-2015 [Section No. 6.4.2.2.4.2]	
Public Input No. 364-NFPA 99-2015 [Section No. 3.3.160]	
Public Input No. 367-NFPA 99-2015 [Section No. 5.1.4.6.8]	
Public Input No. 369-NFPA 99-2015 [Section No. 5.1.9.4 [Excluding any Sub-Sections]]	
Public Input No. 370-NFPA 99-2015 [Section No. 5.1.9.4.4]	
Public Input No. 373-NFPA 99-2015 [Section No. 5.1.12.3.10.5]	
Public Input No. 374-NFPA 99-2015 [Section No. 6.4.1.1.3]	
Public Input No. 381-NFPA 99-2015 [Section No. 10.2.5]	
Public Input No. 382-NFPA 99-2015 [Section No. 15.7.4.3.5]	
Public Input No. 383-NFPA 99-2015 [Section No. A.3.3.160]	
Public Input No. 385-NFPA 99-2015 [Section No. A.5.1.3.5.15]	
Public Input No. 386-NFPA 99-2015 [Section No. A.5.1.7]	
Public Input No. 387-NFPA 99-2015 [Section No. A.5.1.9.4(2)]	
Public Input No. 388-NFPA 99-2015 [Section No. A.5.1.9.4.4(1)]	

Submitter Information Verification

Submitter Full Name: GARY BECKSTRAND
Organization: UTAH ELECTRICAL JATC
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jul 05 11:44:24 EDT 2015

Committee Statement

Resolution: FR-104-NFPA 99-2015

Statement: Definition for Critical Care Area or Space is no longer necessary and should be eliminated to avoid confusion of technical terms used in NFPA 99. The term has changed to reflect Category language. This term is now designated as shown in NFPA 99: 3.3.137 Patient Care Space designated as Category 1 Space. This definition and any references to the term "Critical Care Area" or "Critical Care Space" used through out NFPA 99 should be removed and/or changed to “Category 1 Space”.

Public Input No. 198-NFPA 99-2015 [New Section after 3.3.29]

Cryogenic Fluid Supply System

An assembly of equipment including a stationary tank(s) that is permanently installed through anchoring to a foundation, pressure regulators, pressure relief devices, vaporizers, manifolds, and interconnecting piping that is designed to be filled at the health care facility with a cryogenic gas and that terminates at the source valve.

Statement of Problem and Substantiation for Public Input

To harmonize with terminology used in NFPA 55. The word stationary was added to clarify the requirements between stationary and portable systems. This enables us to eliminate duplicate requirements in 5.1.3.5.13 that applied to stationary microbulk systems.

Submitter Information Verification

Submitter Full Name: KAREN KOENIG
Organization: CGA
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jun 15 15:22:43 EDT 2015

Committee Statement

Resolution: FR-602-NFPA 99-2015
Statement: To harmonize with terminology used in NFPA 55. The word stationary was added to clarify the requirements between stationary and portable systems. This enables us to eliminate duplicate requirements in 5.1.3.5.13 that applied to stationary microbulk systems.

Public Input No. 199-NFPA 99-2015 [New Section after 3.3.29]

Bulk Cryogenic Fluid System
A cryogenic fluid supply system that has a storage capacity of more than 566 m3 [20,000 ft3 (scf)].

Statement of Problem and Substantiation for Public Input

Alignment with NFPA 55 definitions of supply systems.

Submitter Information Verification

Submitter Full Name: KAREN KOENIG
Organization: CGA
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jun 15 15:24:59 EDT 2015

Committee Statement

Resolution: FR-602-NFPA 99-2015
Statement: To harmonize with terminology used in NFPA 55. The word stationary was added to clarify the requirements between stationary and portable systems. This enables us to eliminate duplicate requirements in 5.1.3.5.13 that applied to stationary microbulk systems.

Public Input No. 200-NFPA 99-2015 [New Section after 3.3.29]

Microbulk Cryogenic Fluid Supply System
A cryogenic fluid supply system that has a storage capacity of less than or equal to 566 m3 [20,000 ft3 (scf)].

Statement of Problem and Substantiation for Public Input

Alignment with NFPA 55 definitions of supply systems.

Submitter Information Verification

Submitter Full Name: KAREN KOENIG
Organization: CGA
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jun 15 15:26:22 EDT 2015

Committee Statement

Resolution: FR-602-NFPA 99-2015
Statement: To harmonize with terminology used in NFPA 55. The word stationary was added to clarify the requirements between stationary and portable systems. This enables us to eliminate duplicate requirements in 5.1.3.5.13 that applied to stationary microbulk systems.

Public Input No. 35-NFPA 99-2015 [New Section after 3.3.34]

3.3.37

3.3.37 Designee. Designee is an individual or third party organization appointed by the AHJ or their governing body. This individual or third party organization shall be considered the AHJ for the appointed system (s). When a Designee is appointed for the medical gas systems, the Designee shall be credentialed to ASSE 6020 *Professional Qualifications Standard for Medical Gas Systems Inspector or ASSE 6030* Professional Qualifications Standard for Medical Gas Systems Verifier.

Statement of Problem and Substantiation for Public Input

The City in some cases will push the medical gas inspections off on to a third party or a special inspections person. This will now provide some guidance as to what these designee's are to be certified too.

Submitter Information Verification

Submitter Full Name: John Gregory
Organization: HDR Architecture Inc.
Affilliation: P.I.P.E. Medical Gas Committee Phoenix AZ
Street Address:
City:
State:
Zip:
Submittal Date: Wed Apr 08 18:47:29 EDT 2015

Committee Statement

Resolution: The proposed definition is specific to medical gas piping. It also violates the NFPA Manual of Style as it include requirements for the qualifications of such a person.

Public Input No. 48-NFPA 99-2015 [New Section after 3.3.73]

Hyperbaric Operations defined.

3.i.i.i Hyperbaric Operations. Procedures conducted on the patient receiving hyperbaric treatment to include: (a) therapy inside a hyperbaric chamber, (b) changing clothes, (c) vital signs, (d) non-invasive transcutaneous oxygen monitoring, (e) clinical and medical assessments, and (f) minor dressing changes. [Debridement or other surgical procedures, application of casting material, application of skin substitutes, and application of bio-engineered grafts are not permitted in the chamber room.] (HYP)

Additional Proposed Changes

File Name	Description	Approved
PC_38_HYP.pdf	NFPA 99_PC38	

Statement of Problem and Substantiation for Public Input

NOTE: The following Public Input appeared as “Reject but Hold” in Public Comment No. 38 of the (A2014) Second Draft Report for NFPA 99 and per the Regs. At 4.4.8.3.1.
Defining Hyperbaric Procedures affords the AHJs and end users an understanding of the activities allowed in the hyperbaric room.

Submitter Information Verification

Submitter Full Name: TC ON HEA-HYP
Organization: NFPA
Street Address:
City:
State:
Zip:
Submittal Date: Thu Apr 09 14:21:33 EDT 2015

Committee Statement

Resolution: FR-301-NFPA 99-2015
Statement: NOTE: The following Public Input appeared as “Reject but Hold” in Public Comment No. 38 of the (A2014) Second Draft Report for NFPA 99 and per the Regs. At 4.4.8.3.1.

Defining Hyperbaric Procedures affords the AHJs and end users an understanding of the activities allowed in the hyperbaric room.

Public Input No. 18-NFPA 99-2015 [Section No. 3.3.98]

3.3.98* Medical ~~/~~ Office (Dental Office) .

A building or part thereof in which the following occur: (1) examinations and minor treatments/procedures are performed under the continuous supervision of a medical ~~/~~ or dental professional; (2) ~~only~~ no more than sedation or local anesthesia is involved, and treatment or procedures do not render the patient incapable of self-preservation under emergency conditions; and (3) overnight stays for patients or 24-hour ~~operation~~ operations are not provided. (FUN)

Statement of Problem and Substantiation for Public Input

To improve readability of the Code, and for compatibility with the Style Manuals of other NFPA Codes that extract content from NFPA 99.

Ambiguous as to whether BOTH medical AND dental (treatments, professionals) or medical OR dental.

Also (2) ambiguously appears to REQUIRE that sedation or local anesthesia MUST be performed at a MINIMUM (rather than OPTIONALLY at a MAXIMUM)..

Also (3) to correctly match the pluralization of nouns and verbs grammatically.

Submitter Information Verification

Submitter Full Name: BRIAN ROCK
Organization: HUBBELL INCORPORATED
Street Address:
City:
State:
Zip:
Submittal Date: Sun Mar 22 14:33:38 EDT 2015

Committee Statement

Resolution: FR-105-NFPA 99-2015

Statement: To improve readability of the Code, and for compatibility with the Style Manuals of other NFPA Codes that extract content from NFPA 99.

The existing language was ambiguous as to whether BOTH medical AND dental (treatments, professionals) or medical OR dental.

Item (2) could have been interpreted to REQUIRE that sedation or local anesthesia MUST be performed at a MINIMUM (rather than OPTIONALLY at a MAXIMUM)..

The definition for dental office has been separated out from that for medical office. It is more logical for a code user to look for the definition of dental office on its own rather than look for it under medical office. See FR 905.

Also (3) to correctly match the pluralization of nouns and verbs grammatically.

Public Input No. 249-NFPA 99-2015 [New Section after 3.3.116]

TITLE OF NEW CONTENT

Add a new definition of of nonseparable connection to read:

3.3.117 Nonseparable connection. A type of connection that once connected is not intended to be disconnected and has the durability, strength, thermal and sealing capability of the pipe or tubing to which it is applied.

Statement of Problem and Substantiation for Public Input

A new definition of nonseparable connection is proposed to define the term that is currently used in the code, and is proposed to be added in several locations in this proposal. It is noted that the term “semipermanent connection” is defined in 3.3.164, and the new definition therefore appropriate.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 269-NFPA 99-2015 [Section No. 5.1.10.1.4]	
Public Input No. 270-NFPA 99-2015 [New Section after 5.1.10.1.5]	
Public Input No. 271-NFPA 99-2015 [Section No. 5.1.10.3.1]	
Public Input No. 272-NFPA 99-2015 [New Section after 5.1.10.3.1]	
Public Input No. 273-NFPA 99-2015 [New Section after 5.1.10.8]	
Public Input No. 275-NFPA 99-2015 [Section No. 5.1.11.1.1]	

Submitter Information Verification

Submitter Full Name: THEODORE LEMOFF
Organization: TLemoff Engineering
Affilliation: Omega Flex
Street Address:
City:
State:
Zip:
Submittal Date: Fri Jun 26 11:43:08 EDT 2015

Committee Statement

Resolution: FR-658-NFPA 99-2015

Statement: A new definition of nonseparable connection is proposed to define the term that is currently used in the code, and is proposed to be added in several locations in this proposal. It is noted that the term “semipermanent connection” is defined in 3.3.164, and the new definition therefore appropriate.

Public Input No. 147-NFPA 99-2015 [New Section after 3.3.119]

3.3.120 Oxygen Concentrator Unit. An engineered assembly of components which operate to separate air into constituent gases, typically providing oxygen 93 as their product.

Statement of Problem and Substantiation for Public Input

New definition needed to support the concentrators proposal.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 135-NFPA 99-2015 [New Section after 5.1.3.8.5]	Parent

Submitter Information Verification

Submitter Full Name: MARK ALLEN
Organization: BEACON MEDAES
Street Address:
City:
State:
Zip:
Submittal Date: Mon May 25 12:29:57 EDT 2015

Committee Statement

Resolution: FR-106-NFPA 99-2015
Statement: This new definition has been added to support the extensive new material on oxygen concentrators that has been added into Chapter 5.

Public Input No. 130-NFPA 99-2015 [Section No. 3.3.124]

3.3.124

–

Oxygen USP.

~~Oxygen complying with Medical USP Oxygen, USP or Oxygen 93, USP .~~

Statement of Problem and Substantiation for Public Input

This new definition recognizes that two medical oxygen monographs exist, are in clinical use and should be recognized in the 99.

Submitter Information Verification

Submitter Full Name: MARK ALLEN
Organization: BEACON MEDAES
Street Address:
City:
State:
Zip:
Submittal Date: Mon May 25 10:52:06 EDT 2015

Committee Statement

Resolution: FR-107-NFPA 99-2015
Statement: This new definition recognizes that two medical oxygen monographs exist, are in clinical use and should be recognized in NFPA 99.

Public Input No. 359-NFPA 99-2015 [Section No. 3.3.125]

3.3.125 Patient Bed Location.

The location of a patient sleeping bed, or the bed or procedure table of a ~~critical care~~ Category 1 space. (ELS)

Statement of Problem and Substantiation for Public Input

The definition for Critical Care Area is covered in NFPA 99: 3.3.137 Patient Care Space and is designated as Category 1 Space. Any references in NFPA 99 to “Critical Care Area” should be changed to “Category 1 Space”.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 357-NFPA 99-2015 [Section No. 3.3.28]	

Submitter Information Verification

Submitter Full Name: GARY BECKSTRAND
Organization: UTAH ELECTRICAL JATC
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jul 05 11:55:06 EDT 2015

Committee Statement

Resolution: FR-2-NFPA 99-2015
Statement: The definition for Critical Care Area is covered in NFPA 99: 3.3.137 Patient Care Space and is designated as Category 1 Space. Any references in NFPA 99 to “Critical Care Area” should be changed to “Category 1 Space”.

Public Input No. 301-NFPA 99-2015 [New Section after 3.3.135]

3.3.134 Plume. The noxious airborne contaminants generated as by-products of certain surgical, diagnostic, and therapeutic techniques. Plume is commonly associated with procedures that include the cutting, ablation, cauterization, or mechanical manipulation of target tissue by energy-based devices such as lasers, electrosurgical generators, broadband light sources, ultrasonic instruments, etc. or mechanical surgical tools such as bone saws, high speed drills and reamers.

Statement of Problem and Substantiation for Public Input

Term is used (9.3.4) but not defined. This definition follows the ISO version.

Submitter Information Verification

Submitter Full Name: MARK ALLEN
Organization: BEACON MEDAES
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jul 01 12:56:37 EDT 2015

Committee Statement

Resolution: FR-403-NFPA 99-2015
Statement: Provided a definition of plume as used in the code.

Public Input No. 302-NFPA 99-2015 [New Section after 3.3.135]

3.3.135 Producer (vacuum, WAGD or plume evacuation). The machine(s) or device(s) which generate the flow and vacuum required for these systems to operate. Examples of these producers include vacuum pumps, fans, blowers, and venturis.

Statement of Problem and Substantiation for Public Input

This term is used for WAGD and for Plume, but not defined.

Submitter Information Verification

Submitter Full Name: MARK ALLEN
Organization: BEACON MEDAES
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jul 01 12:58:34 EDT 2015

Committee Statement

Resolution: FR-603-NFPA 99-2015
Statement: This term is used for WAGD and for Plume, but not defined.

Public Input No. 31-NFPA 99-2015 [New Section after 3.3.155]

3.3.156 Special Inspector

3.3.156 Special Inspector. The “Special Inspector”, since jurisdictions and approval agencies vary, as do their responsibilities, a Special Inspector shall be retained by either the AHJ, RDPRC or the owner. A Special Inspector may be one of the following and shall be considered the “designee”:

(1) Registered Design Professional in Responsible Charge (RDPRC) regularly involved in design of medical gas systems.

(2) Third party inspector approved by both the AHJ and the RDPRC, and credentialed to ASSE 6020 standards.

(3) The Special Inspector shall follow the process and procedures outlined in ASSE 6000 Appendix B.

Statement of Problem and Substantiation for Public Input

Special Inspector needs a definition to better define who this can be

Submitter Information Verification

Submitter Full Name: John Gregory
Organization: HDR Architecture Inc.
Affilliation: PIPE Medical Gas Committee Phoenix, AZ
Street Address:
City:
State:
Zip:
Submittal Date: Wed Apr 08 12:42:56 EDT 2015

Committee Statement

Resolution: The proposed definition is specific to medical gas piping and it includes requirements which is not in accordance with the NFPA Manual of Style.

Public Input No. 29-NFPA 99-2015 [New Section after 3.3.156]

3.3.156 (carried over from NFPA 1, 101 and 5000 section 3.3.258 Special Inspections)

3.3.156 Special Inspections. Services provided by a designated agent known as a ~~qualified person~~ Special Inspector , and retained by the AHJ, Registered Design Professional in Responsible Charge (RDPRC) , or the owner. The Special Inspector shall be considered the Designee for inspecting the medical gas system, materials, installation, documentation, process and procedures, site observations and witness to all required contractors tests prior to the verification process.

Statement of Problem and Substantiation for Public Input

same comment as previous Special Inspector comment

Submitter Information Verification

Submitter Full Name: John Gregory
Organization: HDR Architecture Inc.
Affilliation: PIPE Medical Gas Committee Phoenix, AZ
Street Address:
City:
State:
Zip:
Submittal Date: Wed Apr 08 12:23:57 EDT 2015

Committee Statement

Resolution: The proposed definition is specific to medical gas piping and it includes requirements which is not in accordance with the NFPA Manual of Style.

Public Input No. 113-NFPA 99-2015 [Section No. 3.3.159]

3.3.159 – Supply Source. Those portions of the central supply system which act as a self contained supply acting in one of the roles described below:

3.3.159.1 – Operating Supply. ~~The portion of the central supply system that normally supplies is supplying the piping systems. The operating supply consists of a primary supply or a primary and secondary supply~~ system at the time of observation. ~~(PIP)~~

~~3.3.159.2 – Primary Supply. That portion of the source equipment that actually supplies the central supply system that is the default supply for the piping system. (PIP)~~

~~3.3.159.3 – Reserve Supply. Where provided, that portion of the source equipment that automatically supplies the system in the event of failure of the primary and secondary operating supply central supply system that will supply the piping system when the primary and secondary supplies are exhausted or are not operative. (PIP)~~

~~3.3.159.4 – Secondary Supply. Where provided, that portion of the source equipment that automatically supplies the central supply system that will supply the piping system when the primary supply becomes is exhausted or is not operative. (PIP)~~

Statement of Problem and Substantiation for Public Input

The term Central Supply systems is quite important in using Chapter 5, but it is never formally defined. The term central supply system is used as is the term "Supply Source" but the usage is not entirely consistent. The proposal attempts to improve this.

Submitter Information Verification

Submitter Full Name: MARK ALLEN
Organization: BEACON MEDAES
Street Address:
City:
State:
Zip:
Submittal Date: Mon May 25 10:07:49 EDT 2015

Committee Statement

Resolution: FR-601-NFPA 99-2015
Statement: terminology

Public Input No. 364-NFPA 99-2015 [Section No. 3.3.160]

3.3.160* Surface-Mounted Medical Gas Rail Systems.

A surface-mounted gas delivery system intended to provide ready access for two or more gases through a common delivery system to provide multiple gas station outlet locations within a single patient room or ~~critical care area~~ Categroy 1 space . (PIP)

Statement of Problem and Substantiation for Public Input

Definition for Critical Care Area is covered in NFPA 99: 3.3.137 Patient Care Space and is designated as Category 1 Space. Any references in NFPA 99 to “Critical Care Area” should be changed to “Category 1 Space”.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 357-NFPA 99-2015 [Section No. 3.3.28]	

Submitter Information Verification

Submitter Full Name: GARY BECKSTRAND
Organization: UTAH ELECTRICAL JATC
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jul 05 12:08:37 EDT 2015

Committee Statement

Resolution: FR-604-NFPA 99-2015
Statement: temrinology

Public Input No. 482-NFPA 99-2015 [New Section after 4.2.1]

4.2.1

Type your content here ...

The governing body is responsible for conducting risk assessments and shall have the authority to determine the risk.

Statement of Problem and Substantiation for Public Input

this will help to clearly identify that the governing body can determine risk. and the AHJ does not have to

Submitter Information Verification

Submitter Full Name: DAVID DAGENAIS
Organization: WENTWORTH-DOUGLASS HOSPITAL
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 16:25:52 EDT 2015

Committee Statement

Resolution: FR-108-NFPA 99-2015

Statement: This revision is intended help to clearly identify that the health care facility's governing body is the responsible party to determine risk. Section 4.2.3 has been revised to clarify that risk assessments are not needed if the user selects to meet Category 1 requirements.

Public Input No. 457-NFPA 99-2015 [Section No. 4.2.1]

4.2.1

Categories shall be determined by ~~following~~ the governing body by following and documenting a defined risk assessment procedure.

Statement of Problem and Substantiation for Public Input

this should help the AHJ understand who is responsible for the risk assessment.

Submitter Information Verification

Submitter Full Name: DAVID DAGENAIS
Organization: WENTWORTH-DOUGLASS HOSPITAL
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 15:12:35 EDT 2015

Committee Statement

Resolution: FR-108-NFPA 99-2015
Statement: This revision is intended help to clearly identify that the health care facility's governing body is the responsible party to determine risk. Section 4.2.3 has been revised to clarify that risk assessments are not needed if the user selects to meet Category 1 requirements.

Public Input No. 148-NFPA 99-2015 [New Section after 4.2.2]

4.2.2 A documented risk assessment shall not be required for Category 1 except as required by 4.4.3.

Statement of Problem and Substantiation for Public Input

Please see proposal for new 4.4.3

Submitter Information Verification

Submitter Full Name: MARK ALLEN
Organization: BEACON MEDAES
Street Address:
City:
State:
Zip:
Submittal Date: Mon May 25 12:32:19 EDT 2015

Committee Statement

Resolution: This language is too specific to medical gas systems. If the HEA-PIP TC wishes to implement some of this change it should be done in Chapter 5. The proposed text also considers intervening measures which the risk assessment of Chapter 4 are not meant to include.

Public Input No. 149-NFPA 99-2015 [New Section after 4.4.2.5]

4.4.3 The governing authority of the healthcare facility shall conduct a risk assessment, in light of the category of occupancies served, of their supply arrangements for medical gases, and their patient populations, which assessment shall include at least the following:

(1) the source types and locations,

(2) the facility's supply chain arrangements,

(3) security and access to the equipment,

(4) the awareness of the medical staff to the operational limitations of each source and that any therapeutic concerns have been addressed in the selection of respiratory devices, monitoring procedures and clinical protocols.

Any vulnerabilities or limitations that arise from the above assessment shall be considered in determining the Category of systems employed and in the facility's emergency preparedness and operating procedures.

Statement of Problem and Substantiation for Public Input

This proposal attempts to deal with three ongoing concerns with the sizing, placement and security of medical gas source equipment. Some current examples:
Medical gas source equipment has been installed in vulnerable locations, which could have been easily foreseen had this been part of the design analysis. Recent examples include flooding of basements which contain the medical air and vacuum equipment and oxygen bulk tanks swept away by floods. These risks were not considered during design, but would have been easily prevented had an analysis been conducted.

We are observing concerns arising from the fact that although medical air is a pharmaceutical listed in USP, we do not assure air quality under all conditions of intake. This is also seen in concern over intake security in the event of external events (smoke, biohazard, air pollution, etc). This would also be considered during a risk analysis.

Oxygen concentrators are a technology which has begun to reach a level of reliability, economics and clinical acceptance where many facilities are using them. They are not the same as the traditional oxygen supply methods we are familiar with in the U.S. in that they do not all provide 99% Oxygen. While there is overwhelming clinical evidence that this is not a problem in therapy, it is essential that the facility adjust their protocols to account for the difference and that the medical staff be aware this limitation exists.

A failure which might be manageable or of small consequence in a short medical gas interruption (i.e. critical patients on ventilators or in surgery might be "bagged", cylinder supplies could be deployed) could readily become very problematic if long continued. This time dimension is not presently considered in the tests for Categories, and it would be very advantageous to use a similar risk based assessment looking at the supply arrangements with a long outage in mind.

Medical gas sources are a particular concern in design and construction since they need separation, ventilation, temperature control and placement appropriate to the hazards associated with the gases. While the facility is assessing their Categories in the various occupancies is an ideal time for them to also consider any conditions specific to these sources.

Submitter Information Verification

Submitter Full Name: MARK ALLEN
Organization: BEACON MEDAES
Street Address:
City:
State:
Zip:
Submittal Date: Mon May 25 12:34:13 EDT 2015

Committee Statement

Resolution: This language is too specific to medical gas systems. If the HEA-PIP TC wishes to implement some of this change it should be done in Chapter 5. The proposed text also considers intervening measures which the risk assessment of Chapter 4 are not meant to include.

Public Input No. 391-NFPA 99-2015 [Section No. 5.1.1.2]

5.1.1.2

Category 1 piped gas or piped vacuum system requirements shall be applied where any of the following criteria is met:

(1) General anesthesia, deep sedation, or ~~deep~~ moderate sedation is performed as defined in 3.3.61.1 and 3.3.61.2.

(2) The loss of the piped gas or piped vacuum systems is likely to cause major injury or death of patients, staff, or visitors.

(3) The facility piped gas or piped vacuum systems are intended for Category 1 patient care space per 3.3.127.1.

Statement of Problem and Substantiation for Public Input

This is how we define anesthetizing locations. This clarifies that moderate sedation could be performed in a Category 1 facility and aligned with the requirements for anesthetizing locations. See section 5.1.4.6.8 for cross reference.

Submitter Information Verification

Submitter Full Name: JONATHAN WILLARD
Organization: ACUTE MEDICAL GAS SERVICES
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jul 05 12:58:06 EDT 2015

Committee Statement

Resolution: Moderate sedation should not require a Category 1 system. The language does not exclude moderate sedation in a location served by a Category 1 system.

Public Input No. 59-NFPA 99-2015 [Section No. 5.1.3.1.8]

5.1.3.1.8

5.1.3.1.8 Locations containing positive pressure gases other than oxygen and medical air shall :

(1) have their door(s) labeled substantially as follows:

Positive Pressure Gases

NO Smoking or Open Flame

Room May Have Insufficient Oxygen

Do Not Enter If Oxygen Depletion Warning is Lit

Open Door and Allow Room to Ventilate Before Entering

(2) Be equipped with an oxygen depletion monitor which shall indicate when oxygen level in the room is below 19.5%. The monitor shall:

(a) have the oxygen sensor mounted on or near the central supply system, and

(b) have a visual and audible annunciator at the main entrance to the room.

Statement of Problem and Substantiation for Public Input

Manifold rooms meet the OSHA definition for confined spaces:
“A confined space has limited or restricted means for entry or exit, and it is not designed for continuous employee occupancy. Confined spaces include, but are not limited to underground vaults, tanks, storage bins, manholes, pits, silos, process vessels, and pipelines. OSHA uses the term “permit-required confined space” (permit space) to describe a confined space that has one or more of the following characteristics: "contains or has the potential to contain a hazardous atmosphere...”
http://osha.gov/SLTC/confinedspaces/index.html
They present a recognized hazard to the worker who enters the room unaware of the possible lack of oxygen. Oxygen depletion monitors are now being applied to ameliorate this hazard in many similar situations in labs and industrial settings.

Submitter Information Verification

Submitter Full Name: Mark Allen
Organization: Beacon Medaes
Street Address:
City:
State:
Zip:
Submittal Date: Thu Apr 09 16:12:49 EDT 2015

Committee Statement

Resolution: FR-901-NFPA 99-2015
Statement: Manifold rooms present a recognized hazard to the worker who enters the room unaware of the possible lack of oxygen. Oxygen depletion monitors are now being applied to ameliorate this hazard in many similar situations in labs and industrial settings.

Oxygen monitors are also now required for oxygen storage locations. This will increase the safety for those entering these locations. There is an OSHA requirement that potentially hazardous locations are monitored to ensure personnel safety is protected and these locations remain safe for staff.

Public Input No. 114-NFPA 99-2015 [Section No. 5.1.3.3.1.1]

5.1.3.3.1.1 – Any of the following central supply systems shall be permitted to be located together in the same outdoor enclosure:

(1) Manifolds for gas cylinders (see 5.1.3.5.11)

(2) Manifolds for cryogenic liquid containers (see 5.1.3.5.12)

(3) Bulk cryogenic liquid central supply systems (see 5.1.3.5.14)

Statement of Problem and Substantiation for Public Input

The term Central Supply systems is quite important in using Chapter 5, but it is never formally defined. The term central supply system is used as is the term "Supply Source" but the usage is not entirely consistent. The proposal attempts to improve this.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 112-NFPA 99-2015 [New Section after 3.3.22]	parent submission

Submitter Information Verification

Submitter Full Name: MARK ALLEN
Organization: BEACON MEDAES
Street Address:
City:
State:
Zip:
Submittal Date: Mon May 25 10:09:51 EDT 2015

Committee Statement

Resolution: FR-601-NFPA 99-2015
Statement: terminology

Public Input No. 136-NFPA 99-2015 [Section No. 5.1.3.3.1.1]

5.1.3.3.1.1

Any of the following systems shall be permitted to be located together in the same outdoor enclosure:

(1) Manifolds for gas cylinders *(see 5.1.3.5.11)*

(2) Manifolds for cryogenic liquid containers *(see 5.1.3.5.12)*

(3) Bulk cryogenic liquid systems *(see 5.1.3.5.14)*

(4) Individual components on the oxygen side of concentrator sources (e.g. concentrator unit, oxygen reservoir, regulating devices) (see 5.1.3.9)

Statement of Problem and Substantiation for Public Input

A concentrator has parts which will handle air and parts which handle oxygen enriched air at various percentages. The equipment on the oxygen (output) side should be treated the same as any other oxygen containing source.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 135-NFPA 99-2015 [New Section after 5.1.3.8.5]	Parent

Submitter Information Verification

Submitter Full Name: MARK ALLEN
Organization: BEACON MEDAES
Street Address:
City:
State:
Zip:
Submittal Date: Mon May 25 11:56:19 EDT 2015

Committee Statement

Resolution: FR-606-NFPA 99-2015

Statement: A concentrator has parts which will handle air and parts which handle oxygen enriched air at various percentages. The equipment on the oxygen (output) side should be treated the same as any other oxygen containing source.

Public Input No. 137-NFPA 99-2015 [Section No. 5.1.3.3.1.2]

5.1.3.3.1.2

Any of the following systems shall be permitted to be located together in the same indoor enclosure:

(1) Manifolds for gas cylinders *(see 5.1.3.5.11)*

(2) Manifolds for cryogenic liquid containers *(see 5.1.3.5.12)*

(3) In-building emergency reserves *(see 5.1.3.5.16)*

(4) Instrument air standby headers *(see 5.1.13.3.5.7)*

(5) Individual components on the oxygen side of concentrator sources (e.g. concentrator unit, oxygen reservoir, regulating devices) *(see 5.1.3.9)*

Statement of Problem and Substantiation for Public Input

The equipment on the oxygen side of a concentrator should be treated the same as any other oxygen containing source.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 135-NFPA 99-2015 [New Section after 5.1.3.8.5]	Parent

Submitter Information Verification

Submitter Full Name: MARK ALLEN
Organization: BEACON MEDAES
Street Address:
City:
State:
Zip:
Submittal Date: Mon May 25 12:00:29 EDT 2015

Committee Statement

Resolution: FR-607-NFPA 99-2015
Statement: The equipment on the oxygen side of a concentrator should be treated the same as any other oxygen containing source.

Public Input No. 115-NFPA 99-2015 [Section No. 5.1.3.3.1.3]

5.1.3.3.1.3 – Any of the following central supply systems shall be permitted to be located together in the same room:

(1) Medical air compressor central supply systems supply sources (see 5.1.3.6.3)

(2) Medical–surgical vacuum central supply systems sources (see 5.1.3.7)

(3) Waste anesthetic gas disposal (WAGD) central supply systems sources (see 5.1.3.8)

(4) Instrument air compressor central supply systems sources (see 5.1.13.3.5)

(5) Any other compressor, vacuum pump, or electrically powered machinery

Statement of Problem and Substantiation for Public Input

The term Central Supply systems is quite important in using Chapter 5, but it is never formally defined. The term central supply system is used as is the term "Supply Source" but the usage is not entirely consistent. The proposal attempts to improve this.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 112-NFPA 99-2015 [New Section after 3.3.22]	Parent Submission

Submitter Information Verification

Submitter Full Name: MARK ALLEN
Organization: BEACON MEDAES
Street Address:
City:
State:
Zip:
Submittal Date: Mon May 25 10:15:30 EDT 2015

Committee Statement

Resolution: FR-601-NFPA 99-2015
Statement: terminology

Public Input No. 138-NFPA 99-2015 [Section No. 5.1.3.3.1.3]

5.1.3.3.1.3

Any of the following systems shall be permitted to be located together in the same room:

(1) Medical air compressor supply sources *(see 5.1.3.6.3)*

(2) Medical–surgical vacuum sources *(see 5.1.3.7)*

(3) Waste anesthetic gas disposal (WAGD) sources *(see 5.1.3.8)*

(4) Instrument air compressor sources *(see 5.1.13.3.5)*

(5) Any other compressor, vacuum pump, or electrically powered machinery

(6) Compressors, dryers, and air receivers used to supply oxygen concentrators (i.e. individual components on the air side of concentrators) *(see 5.1.3.9)* ,

(7) Concentrator units with air and oxygen sides in an integral unit *(see 5.1.3.9).*

Statement of Problem and Substantiation for Public Input

The equipment on the air side of a concentrator should be treated the same as any other air containing source. This makes sense when the concentrator is in a "train" with air compressor, dryer, receiver, and concentrator. The exception that must be made is for integral concentrator units which contain the air and oxygen elements in a single "package". In those designs, since the larger risk with respect to their location comes on the air side, they are placed here.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 135-NFPA 99-2015 [New Section after 5.1.3.8.5]	Parent

Submitter Information Verification

Submitter Full Name: MARK ALLEN
Organization: BEACON MEDAES
Street Address:
City:
State:
Zip:
Submittal Date: Mon May 25 12:02:01 EDT 2015

Committee Statement

Resolution: FR-608-NFPA 99-2015

Statement: The equipment on the air side of a concentrator should be treated the same as any other air containing source. This makes sense when the concentrator is in a "train" with air compressor, dryer, receiver, and concentrator. The exception that must be made is for integral concentrator units which contain the air and oxygen elements in a single "package". In those designs, since the larger risk with respect to their location comes on the air side, they are placed here.

Public Input No. 116-NFPA 99-2015 [Section No. 5.1.3.3.1.4]

5.1.3.3.1.4

_

Any central supply system listed under 5.1.3.3.1.3 shall not be located in the same room with any central supply system listed under 5.1.3.3.1.1 or 5.1.3.3.1.2 , except instrument air reserve headers complying with 5.1.3.2.12 and 5.1.13.3.5.7 shall be permitted to be in the same room as an instrument air compressor.

Statement of Problem and Substantiation for Public Input

The term Central Supply systems is quite important in using Chapter 5, but it is never formally defined. The term central supply system is used as is the term "Supply Source" but the usage is not entirely consistent. The proposal attempts to improve this.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 112-NFPA 99-2015 [New Section after 3.3.22]	

Submitter Information Verification

Submitter Full Name: MARK ALLEN
Organization: BEACON MEDAES
Street Address:
City:
State:
Zip:
Submittal Date: Mon May 25 10:16:57 EDT 2015

Committee Statement

Resolution: FR-601-NFPA 99-2015
Statement: terminology

Public Input No. 166-NFPA 99-2015 [Section No. 5.1.3.3.2]

5.1.3.3.2* Design and Construction.

Locations for central supply systems and the storage of positive-pressure gases shall meet the following requirements:

(1) They shall be constructed with access to move cylinders, equipment, and so forth, in and out of the location on hand trucks complying with 11.4.3.1.1.

(2) They shall be provided with lockable doors or gates or otherwise able to be secured.

(3) If outdoors, they shall be provided with an enclosure (wall or fencing) constructed of noncombustible materials with a minimum of two entry/exits.

(4) If outdoors, bulk cryogenic liquid systems shall be provided with a minimum of two entry/exits.

(5) If indoors, they shall have interior finishes of noncombustible or limited-combustible materials.

(6) * If indoors, the room shall be separated from the rest of the building by walls and floors having a one-hour fire resistance rating with doors and other opening protectives having a ¾ -hour fire protection rating.

(7) * They shall comply with *NFPA 70*, *National Electrical Code*, for ordinary locations.

(8) They shall be heated by indirect means (e.g., steam, hot water) if heat is required.

(9) They shall be provided with racks, chains, or other fastenings to secure all cylinders from falling, whether connected, unconnected, full, or empty.

(10)* They shall be supplied with electrical power compliant with the requirements for essential electrical systems as described in Chapter 6.

(11) They shall have racks, shelves, and supports, where provided, constructed of noncombustible materials or limited-combustible materials ***EXCEPT WOOD*** . ***[Wood should be clearly excluded if that is the intent unless noncombustible or limited combustible wood is acceptable as per 4.4.1 through 4.4.2]***

(12) They shall protect electrical devices from physical damage.

(13) They shall allow access by delivery vehicles and management of cylinders (e.g., proximity to loading docks, access to elevators, and passage of cylinders through public areas).

(14) They shall be designed to meet the operational requirements of 5.1.3.2 with regard to room temperature.

Statement of Problem and Substantiation for Public Input

During Medical Gas Instructor training, we were taught that no wood is acceptable. Stating that noncombustible or limited combustible materials can be used opens the door for allowing treated wood products to be installed. The paragraph should clearly state that ANY use of wood is unacceptable unless it is the intent to allow wood falling within 4.4.1 through 4.4.2 paragraphs.

Submitter Information Verification

Submitter Full Name: HANS DALKE
Organization: PLUMBERS LOCAL UNION 27
Affilliation: Medical Gas Instructor for Plumbers LU #27
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 03 18:19:25 EDT 2015

Committee Statement

Resolution: The specification for noncombustible or limited-combustible material is adequate. Wood is neither of these things and adding this exemption is not necessary.

Public Input No. 322-NFPA 99-2015 [Section No. 5.1.3.3.2]

5.1.3.3.2* Design and Construction.

Locations for central supply systems and the storage of positive-pressure gases shall meet the following requirements:

(1) They shall be constructed with access to move cylinders, equipment, and so forth, in and out of the location on hand trucks complying with 11.4.3.1.1.

(2) They shall be provided with lockable doors or gates or otherwise able to be secured.

(3) If outdoors, they shall be provided with an enclosure (wall or fencing) constructed of noncombustible materials with a minimum of two entry/exits for rooms greater than 200 ft^2.

(4) If outdoors, bulk cryogenic liquid systems shall be provided with a minimum of two entry/exits.

(5) If indoors, they shall have interior finishes of noncombustible or limited-combustible materials.

(6) * If indoors, the room shall be separated from the rest of the building by walls and floors having a one-hour fire resistance rating with doors and other opening protectives having a ¾ -hour fire protection rating.

(7) * They shall comply with *NFPA 70*, *National Electrical Code*, for ordinary locations.

(8) They shall be heated by indirect means (e.g., steam, hot water) if heat is required.

(9) They shall be provided with racks, chains, or other fastenings to secure all cylinders from falling, whether connected, unconnected, full, or empty.

(10) * They shall be supplied with electrical power compliant with the requirements for essential electrical systems as described in Chapter 6.

(11) They shall have racks, shelves, and supports, where provided, constructed of noncombustible materials or limited-combustible materials.

(12) They shall protect electrical devices from physical damage.

(13) They shall allow access by delivery vehicles and management of cylinders (e.g., proximity to loading docks, access to elevators, and passage of cylinders through public areas).

(14) They shall be designed to meet the operational requirements of 5.1.3.2 with regard to room temperature.

Statement of Problem and Substantiation for Public Input

In some small, outdoor central supply areas, it is not practical or necessary to provide a second exit from the room. A minimum size should be provided to exempt these small outdoor supply areas from being required to provide two entry/exits.

Submitter Information Verification

Submitter Full Name: SAMANTHA WHITE
Organization: Koffel Associates, Inc
Affilliation: Self
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jul 02 16:55:39 EDT 2015

Committee Statement

Resolution: FR-610-NFPA 99-2015

Statement: Item number 8 (now 9) on this list was revised along with its annex material to identify that certain types of electric heat can be considered "indirect means" as allowed to heat the room. Annex material mirroring NFPA 101 on the maximum temperature a heating element should reach was also included.

Item number 3 (now 4) was revised to specify a minimum square footage where two entry/exits are required. In some small, outdoor central supply areas, it is not practical or necessary to provide a second exit from the room.

Public Input No. 393-NFPA 99-2015 [Section No. 5.1.3.3.2]

5.1.3.3.2* Design and Construction.

Locations for central supply systems and the storage of positive-pressure gases shall meet the following requirements:

(1) They shall be constructed with access to move cylinders, equipment, and so forth, in and out of the location on hand trucks complying with 11.4.3.1.1.

(2) They shall be provided with lockable doors or gates or otherwise able to be secured.

(3) If outdoors, they shall be provided with an enclosure (wall or fencing) constructed of noncombustible materials with a minimum of two entry/exits.

(4) If outdoors, bulk cryogenic liquid systems shall be provided with a minimum of two entry/exits.

(5) If indoors, they shall have interior finishes of noncombustible or limited-combustible materials.

(6) * If indoors, the room shall be separated from the rest of the building by walls and floors having a one-hour fire resistance rating with doors and other opening protectives having a ¾ -hour fire protection rating.

(7) * They shall comply with *NFPA 70*, *National Electrical Code*, for ordinary locations.

(8) They shall be heated by indirect means (e.g., steam, hot water) if heat is required.

(9) They shall be provided with racks, chains, or other fastenings to secure all cylinders from falling, whether connected, unconnected, full, or empty.

(10)* They shall be supplied with electrical power compliant with the requirements for essential electrical systems as described in Chapter 6.

(11) They shall have racks, shelves, and supports, where provided, constructed of noncombustible materials or limited-combustible materials.

(12) They shall protect electrical devices from physical damage.

(13) They shall allow access by delivery vehicles and management of cylinders (e.g., proximity to loading docks, access to elevators, and passage of cylinders through public areas).

(14) They shall be designed to meet the operational requirements of 5.1.3.2 with regard to room temperature

(15) They shall be provided with oxygen monitoring system that moitors the oxygen concetration within the location . The monitoring system shall provide an indication if there is an oxygen depleted atmosphere or an oxygen enriched atmoshphere present within the location.

Statement of Problem and Substantiation for Public Input

This will increase the safety for those entering these locations. There is an OSHA requirement that potentially hazardous locations are monitored to ensure personnel safety is protected and these locations remain safe for staff.

Submitter Information Verification

Submitter Full Name: JONATHAN WILLARD
Organization: ACUTE MEDICAL GAS SERVICES
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jul 05 13:02:22 EDT 2015

Committee Statement

Resolution: FR-901-NFPA 99-2015
Statement: Manifold rooms present a recognized hazard to the worker who enters the room unaware of the possible lack of oxygen. Oxygen depletion monitors are now being applied to ameliorate this hazard in many similar situations in labs and industrial settings.

Oxygen monitors are also now required for oxygen storage locations. This will increase the safety for those entering these locations. There is an OSHA requirement that potentially hazardous locations are monitored to ensure personnel safety is protected and these locations remain safe for staff.

Public Input No. 520-NFPA 99-2015 [Section No. 5.1.3.3.2]

5.1.3.3.2 * Design and Construction.

Locations for central supply systems and the storage of positive-pressure gases shall meet the following requirements:

(1) They shall be constructed with access to move cylinders, equipment, and so forth, in and out of the location on hand trucks complying with 11.4.3.1.1.

(2) They shall be provided with lockable doors or gates or otherwise able to be secured.

(3) If outdoors, they shall be provided with an enclosure (wall or fencing) constructed of noncombustible materials with a minimum of two entry/exits.

(4) If outdoors, bulk cryogenic liquid systems shall be provided with a minimum of two entry/exits.

(5) If indoors, they shall have interior finishes of noncombustible or limited-combustible materials.

(6) * If indoors, the room shall be separated from the rest of the building by walls and floors having a one-hour fire resistance rating with doors and other opening protectives having a ¾ -hour fire protection rating.

(7) * They shall comply with *NFPA 70*, *National Electrical Code*, for ordinary locations.

(8) They shall be heated by indirect means (e.g., steam, hot water, electric) if heat is required.

(9) They shall be provided with racks, chains, or other fastenings to secure all cylinders from falling, whether connected, unconnected, full, or empty.

(10) * They shall be supplied with electrical power compliant with the requirements for essential electrical systems as described in Chapter 6.

(11) They shall have racks, shelves, and supports, where provided, constructed of noncombustible materials or limited-combustible materials.

(12) They shall protect electrical devices from physical damage.

(13) They shall allow access by delivery vehicles and management of cylinders (e.g., proximity to loading docks, access to elevators, and passage of cylinders through public areas).

(14) They shall be designed to meet the operational requirements of 5.1.3.2 with regard to room temperature.

Statement of Problem and Substantiation for Public Input

The intent of the current language, and the logic supporting it are not clear to designers utilizing the standard and require clarification. An interpretation request has indicated that indirect means "not in the space" and that a ducted electric resistance unit heater that recirculates air by pulling air from the space, heating it up, and returning it to the space is an indirect means of heat, however an electric resistance unit heater located in the space is not acceptable. The logic of this interpretation is not clear to designers. Preferably the committee would further expand on what is meant by "indirect" by providing a commentary that informs designers on the intent of the requirement. In lieu of stating what means of heating is permissible, it may be better to indicate what forms of heating are not acceptable (fuel fired equipment located in the space).

There are additional standards that address med gas storage rooms that many facilities have to comply with in addition to NFPA, these include the International Fire Code, International Mechanical Code and ASHRAE Standard 170. Compliance with all codes are difficult for designers who must design to the multiple standards.

I believe electric resistance heat is acceptable based on the following logic:

1. The limitations in the standard for electrical is that electrical outlets must be placed a minimum height above the floor to prevent damage to them as gas canisters are moved around.

2. There is no limitation on locating exhaust fans in med gas storage rooms or requiring that med gas storage room fans be explosion proof motors.

Given the above items I understand the committee to not be concerned with electrical equipment located in these spaces and believe indirect was not intended to exclude electric resistance heat, steam or hot water heating located in the space.

Submitter Information Verification

Submitter Full Name: MATTHEW T SCIARRETTI
Organization: HEAPY ENGINEERING
Street Address:
City:
State:

Zip:

Submittal Date: Mon Jul 06 17:25:16 EDT 2015

Committee Statement

Resolution: FR-610-NFPA 99-2015

Statement: Item number 8 (now 9) on this list was revised along with its annex material to identify that certain types of electric heat can be considered "indirect means" as allowed to heat the room. Annex material mirroring NFPA 101 on the maximum temperature a heating element should reach was also included.

Item number 3 (now 4) was revised to specify a minimum square footage where two entry/exits are required. In some small, outdoor central supply areas, it is not practical or necessary to provide a second exit from the room.

Public Input No. 333-NFPA 99-2015 [Section No. 5.1.3.3.3.1]

5.1.3.3.3.1 Ventilation for Indoor Locations.

Medical gas ~~storage and~~ manifold areas, medical gas storage, or transfilling room ventilation shall comply with 9.3.6.

Statement of Problem and Substantiation for Public Input

Add language requiring gas manifolds to reference ventilation. Could not find language stating manifold rooms require ventilation in chapter 5.

Submitter Information Verification

Submitter Full Name: Anthony Lowe
Organization: Allied Hospital Systems
Street Address:
City:
State:
Zip:
Submittal Date: Fri Jul 03 11:51:09 EDT 2015

Committee Statement

Resolution: FR-611-NFPA 99-2015
Statement: Language requiring central supply locations to reference ventilation requirements has been added. Prior to this change it could be argued that manifold rooms and other central supply locations did not directly require ventilation in chapter 5.

Public Input No. 117-NFPA 99-2015 [Section No. 5.1.3.3.3.3]

5.1.3.3.3.3 – Ventilation for Motor-Driven Equipment. ~~The following source locations shall be adequately ventilated to prevent accumulation of heat:~~

~~(1) Medical air sources central supply systems sources (see 5.1.3.6)~~

~~(2) Medical–surgical vacuum sources central supply systems sources (see 5.1.3.7)~~

~~(3) Waste anesthetic gas disposal (WAGD) sources central supply systems sources (see 5.1.3.8.1)~~

~~(4) Instrument air sources central supply systems sources (see 5.1.13.3.5)~~

Statement of Problem and Substantiation for Public Input

The term Central Supply systems is quite important in using Chapter 5, but it is never formally defined. The term central supply system is used as is the term "Supply Source" but the usage is not entirely consistent. The proposal attempts to improve this.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 112-NFPA 99-2015 [New Section after 3.3.22]	Parent

Submitter Information Verification

Submitter Full Name: MARK ALLEN
Organization: BEACON MEDAES
Street Address:
City:
State:
Zip:
Submittal Date: Mon May 25 10:18:04 EDT 2015

Committee Statement

Resolution: FR-601-NFPA 99-2015
Statement: terminology

Public Input No. 13-NFPA 99-2015 [Section No. 5.1.3.3.4]

Please clarify if empty cylinders are counted in determining the cubic feet/meter of stored oxygen in a room.

5.1.3.3.4 Storage.

5.1.3.3.4.1

Full or empty medical gas cylinders, when not connected, shall be stored in locations complying with 5.1.3.3.2 through 5.1.3.3.3 and shall be permitted to be in the same rooms or enclosures as their respective central supply systems.

5.1.3.3.4.2

Cylinders, whether full or empty, shall not be stored in enclosures containing motor-driven machinery, with the exception of cylinders intended for instrument air reserve headers complying with 5.1.13.3.5.7, which shall be permitted to be placed in the same location containing an instrument air compressor when it is the only motor-driven machinery located within the room. Only cylinders intended for instrument air reserve headers complying with 5.1.13.3.5.7 shall be permitted to be stored in enclosures containing instrument air compressors.

Statement of Problem and Substantiation for Public Input

People will know if empty oxygen cylinders are part of the volume calculation for storage

Submitter Information Verification

Submitter Full Name: ANDREW RESTLER
Organization: RELIANT HCS
Affilliation: Skilled nursing facilities
Street Address:
City:
State:
Zip:
Submittal Date: Fri Mar 20 11:02:29 EDT 2015

Committee Statement

Resolution: No proposed text has been provided by the public input. This topic is under the jurisdiction of HEA-MED and Chapter 11 and should be addressed to that TC.

Public Input No. 176-NFPA 99-2015 [Section No. 5.1.3.5 [Excluding any Sub-Sections]]

Central supply systems shall be permitted to consist of the following:

(1) Cylinder manifolds for gas cylinders per 5.1.3.5.11
(2) Manifolds for cryogenic liquid containers per 5.1.3.5.12
(3) Bulk cryogenic liquid systems per 5.1.3.5.14
(4) Medical air compressor systems per 5.1.3.6
(5) Medical–surgical vacuum producers per 5.1.3.7
(6) WAGD producers per 5.1.3.8
(7) Instrument air compressor systems per 5.1.13.3.5
(8) Proportioning systems for medical air USP per 5.1.3.6.3.14
(9) Micro-bulk or small bulk cryogenic systems per 5.1.3.5.13.1

Statement of Problem and Substantiation for Public Input

Micro-bulk or small bulk cryogenic liquid systems are included already under 5.1.3.5.13 - and therefore should be included in the list under 5.1.3.5 as a permitted source.

Submitter Information Verification

Submitter Full Name: JAMES LUCAS
Organization: TRI-TECH MEDICAL INC
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jun 04 15:14:10 EDT 2015

Committee Statement

Resolution: FR-612-NFPA 99-2015
Statement: Update to terminology based on the new cryogenic fluid supply definitions.

Public Input No. 22-NFPA 99-2015 [Section No. 5.1.3.5.2]

5.1.3.5.2 Permitted Locations for Medical Gases.

Central supply systems and medical gas outlets for oxygen, medical air, nitrous oxide, carbon dioxide, and all other patient medical gases shall be piped only into areas where the gases will be used under the direction of licensed medical professionals for purposes congruent with the following:

(1) Direct respiration by patients

(2) Clinical application of the gas to a patient, such as the use of an insufflator to inject carbon dioxide into patient body cavities during laparoscopic surgery and carbon dioxide used to purge heart-lung machine blood flow ways

(3) Medical device applications directly related to respiration

(4) Power for medical devices used directly on patients

(5) Calibration of medical devices intended for (1) through (4)

(6) Simulation centers for the education training and assessment of health care professionals

Statement of Problem and Substantiation for Public Input

Many hospitals and health care facilities have added simulation centers in parts of their facilities. It is necessary to use medical gases in the training and assessment of health care professionals in these simulation centers. There is no danger to patients, staff or the public in using theses piped medical gases in the simulation centers.

Submitter Information Verification

Submitter Full Name: Kerry George
Organization: Des Moines Area Comm Coll
Street Address:
City:
State:
Zip:
Submittal Date: Wed Mar 25 16:43:43 EDT 2015

Committee Statement

Resolution: FR-613-NFPA 99-2015
Statement: The charging language of this section was revised for clarity.

Many hospitals and health care facilities have added simulation centers in parts of their facilities. It is necessary to use medical gases in the training and assessment of health care professionals in these simulation centers. There is no danger to patients, staff or the public in using theses piped medical gases in the simulation centers. Item number 6 was added to allow this use.

Public Input No. 23-NFPA 99-2015 [Section No. 5.1.3.5.2]

5.1.3.5.2 Permitted Locations for Medical Gases.

Central supply systems and medical gas outlets for oxygen, medical air, nitrous oxide, carbon dioxide, and all other patient medical gases shall be piped only into areas where the gases will be used under the direction of licensed medical professionals for purposes congruent with the following:

(1) Direct respiration by patients

(2) Clinical application of the gas to a patient, such as the use of an insufflator to inject carbon dioxide into patient body cavities during laparoscopic surgery and carbon dioxide used to purge heart-lung machine blood flow ways

(3) Medical device applications directly related to respiration

(4) Power for medical devices used directly on patients

(5) Calibration of medical devices intended for (1) through (4)

(6) Simulation centers for the education training and assessment of health care professionals

Statement of Problem and Substantiation for Public Input

Simulation centers utilize standard patient care equipment for training of healthcare providers. The equipment includes mechanical ventilators and anesthesia machines that require the use of 50 psi gasses. Many simulation centers are housed in existing medical facilities that can provide piped gasses for their use, but are not specifically addressed under the current standards.

Submitter Information Verification

Submitter Full Name: Joel Harris
Organization: Rhodes State College
Street Address:
City:
State:
Zip:
Submittal Date: Thu Mar 26 08:01:59 EDT 2015

Committee Statement

Resolution: FR-613-NFPA 99-2015
Statement: The charging language of this section was revised for clarity.

Many hospitals and health care facilities have added simulation centers in parts of their facilities. It is necessary to use medical gases in the training and assessment of health care professionals in these simulation centers. There is no danger to patients, staff or the public in using theses piped medical gases in the simulation centers. Item number 6 was added to allow this use.

Public Input No. 24-NFPA 99-2015 [Section No. 5.1.3.5.2]

5.1.3.5.2 Permitted Locations for Medical Gases.

Central supply systems and medical gas outlets for oxygen, medical air, nitrous oxide, carbon dioxide, and all other patient medical gases shall be piped only into areas where the gases will be used under the direction of licensed medical professionals for purposes congruent with the following:

(1) Direct respiration by patients

(2) Clinical application of the gas to a patient, such as the use of an insufflator to inject carbon dioxide into patient body cavities during laparoscopic surgery and carbon dioxide used to purge heart-lung machine blood flow ways

(3) Medical device applications directly related to respiration

(4) Power for medical devices used directly on patients

(5) Calibration of medical devices intended for (1) through (4)

(6) Simulation centers for the education training and assessment of health care professionals

Statement of Problem and Substantiation for Public Input

Use of medical gases by simulation labs providing training and assessment of healthcare providers. This is specific to training centers using non-animal or cadaver human models, thus minimizing any risk of non-live human use.

Submitter Information Verification

Submitter Full Name: Julianne Perretta
Organization: Johns Hopkins Medicine
Street Address:
City:
State:
Zip:
Submittal Date: Thu Mar 26 08:48:30 EDT 2015

Committee Statement

Resolution: FR-613-NFPA 99-2015
Statement: The charging language of this section was revised for clarity.

Many hospitals and health care facilities have added simulation centers in parts of their facilities. It is necessary to use medical gases in the training and assessment of health care professionals in these simulation centers. There is no danger to patients, staff or the public in using theses piped medical gases in the simulation centers. Item number 6 was added to allow this use.

Public Input No. 50-NFPA 99-2015 [Section No. 5.1.3.5.2]

5.1.3.5.2 _ Permitted Locations for Medical Gases.

Central supply systems

~~and medical gas outlets~~

for oxygen, medical air, nitrous oxide, carbon dioxide, and all other patient medical gases shall be piped only

~~into~~

to medical gas outlets complying with 5.1.5, in areas where the gases will be used under the direction of licensed medical professionals for purposes congruent with the following:

(1) _ Direct respiration by patients

(2) _ Clinical application of the gas to a patient, such as the use of an insufflator to inject carbon dioxide into patient body cavities during laparoscopic surgery and carbon dioxide used to purge heart-lung machine blood flow ways

(3) _ Medical device applications directly related to respiration

(4) _ Power for medical devices used directly on patients

(5) _ Calibration of medical devices intended for (1) through (4)

Statement of Problem and Substantiation for Public Input

The current wording is awkward. This is an attempt to make it read more clearly without changing the intent.

Submitter Information Verification

Submitter Full Name: Mark Allen
Organization: Beacon Medaes
Street Address:
City:
State:
Zip:
Submittal Date: Thu Apr 09 15:25:38 EDT 2015

Committee Statement

Resolution: FR-613-NFPA 99-2015
Statement: The charging language of this section was revised for clarity.

Many hospitals and health care facilities have added simulation centers in parts of their facilities. It is necessary to use medical gases in the training and assessment of health care professionals in these simulation centers. There is no danger to patients, staff or the public in using theses piped medical gases in the simulation centers. Item number 6 was added to allow this use.

Public Input No. 53-NFPA 99-2015 [Section No. 5.1.3.5.5]

5.1.3.5.5 ~~Final~~ _ Controls for Line Pressure ~~Regulators~~ .

~~5.1.3.5.5.1~~ –

~~All positive pressure supply systems shall be provided with duplex line pressure regulators piped in parallel with the following characteristics:~~

(1) ~~They shall be provided with isolation valves on the source side of each regulator.~~

(2) ~~They shall be provided with isolation or check valves on the patient side of each regulator.~~

(3) ~~A pressure indicator(s) shall be located downstream (patient or use side) of each regulator or immediately downstream of the isolating valves for the regulators.~~

(4) ~~They shall be piped to allow either regulator to be serviced without interrupting supply.~~

(5) ~~Each regulator shall be sized for 100 percent of the peak calculated demand.~~

(6) ~~They shall be constructed of materials deemed suitable by the manufacturer.~~

~~5.1.3.5.5.2~~ –

~~The line pressure regulators required under 5.1.3.5.5.1 , when used for bulk cryogenic liquid systems, shall be of a balanced design.~~

Statement of Problem and Substantiation for Public Input

See following proposal for 5.1.3.5.5.1

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 52-NFPA 99-2015 [Section No. 5.1.3.5.5.1]	

Submitter Information Verification

Submitter Full Name: Mark Allen
Organization: Beacon Medaes
Street Address:
City:
State:
Zip:
Submittal Date: Thu Apr 09 15:37:28 EDT 2015

Committee Statement

Resolution: FR-614-NFPA 99-2015
Statement: Line pressure regulators are one of several ways that line pressure can be controlled, particularly for compressor based air sources and vacuum systems. The revised language allows for all effective methods to be used.

Public Input No. 52-NFPA 99-2015 [Section No. 5.1.3.5.5.1]

5.1.3.5.5.1 – All positive pressure supply systems shall be provided with duplex line pressure regulators piped in parallel means to control the final line pressure at the source with at least the following characteristics:

- ~~They shall be provided with isolation valves on the source side of each regulator.~~
- ~~They shall be provided with isolation or check valves on the patient side of each regulator.~~
- ~~A pressure indicator(s) shall be located downstream (patient or use side) of each regulator or immediately downstream of the isolating valves for the regulators.~~
- ~~They shall be piped to allow either regulator to be serviced without interrupting supply.~~
- ~~Each regulator shall be sized for 100 percent of the peak calculated demand.~~

~~They shall~~

(1) able to maintain stable pressures within the limits of Table 5.1.11, and

(2) able to flow 100% of the peak calculated demand, and

(3) redundant, such that each component of the control mechanism can be isolated for service or replacement while maintaining normal operation, and

(4) protected against overpressure (see 5.1.3.5.6), and

(5) be constructed of materials deemed suitable for the service by the manufacturer.

Statement of Problem and Substantiation for Public Input

Line pressure regulators are one of several ways that line pressure can be controlled, particularly for compressor based air sources and vacuum systems. The standard should allow for all effective methods.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 53-NFPA 99-2015 [Section No. 5.1.3.5.5]	

Submitter Information Verification

Submitter Full Name: Mark Allen
Organization: Beacon Medaes
Street Address:
City:
State:
Zip:
Submittal Date: Thu Apr 09 15:34:23 EDT 2015

Committee Statement

Resolution: FR-614-NFPA 99-2015
Statement: Line pressure regulators are one of several ways that line pressure can be controlled, particularly for compressor based air sources and vacuum systems. The revised language allows for all effective methods to be used.

Public Input No. 177-NFPA 99-2015 [Section No. 5.1.3.5.6.3]

5.1.3.5.6.3

Central supply systems for positive pressure gases shall include one or more relief valves, all meeting the following requirements:

(1) They shall be located between each ~~final line regulator and~~ stage of pressure regulation and prior to the source valve.

(2) They shall have a relief setting that is 50 percent above the normal system operating pressure, as indicated in Table 5.1.11.

Statement of Problem and Substantiation for Public Input

If there are multiple stages of pressure regulation, this is not addressed by the code in it's current form.

Submitter Information Verification

Submitter Full Name: JAMES LUCAS
Organization: TRI-TECH MEDICAL INC
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jun 04 15:23:00 EDT 2015

Committee Statement

Resolution: CI-675-NFPA 99-2015
Statement: If there are multiple stages of pressure regulation, this is not addressed by the code in it's current form.

Public Input No. 165-NFPA 99-2015 [Section No. 5.1.3.5.6.4]

5.1.3.5.6.4

When vented outside, relief valve vent lines shall be labeled in accordance with 5.1.11.1 in any manner that will distinguish them from the medical gas pipeline. ***[Relief vent line labeling is not outlined in 5.1.11.1 nor included in table 5.1.11] [There should be a standardized type of label for relief lines, Medical Air intake piping and Medical Surgical Vacuum WAGD exhaust, perhaps with vertical bars in the color scheme of what relief / medical air intake or Medical Surgical / WAGD exhaust is being vented, exhausted or piped in].***

Statement of Problem and Substantiation for Public Input

The problem that would be resolved would be nonstandardization of relief vent labels even within the same building for similarly vented systems. Standardizing these labels would ensure that they are labelled correctly within not only the same facility but in any medical care facility. As written, any number, design or color of labels can currently be used.

Submitter Information Verification

Submitter Full Name: HANS DALKE
Organization: PLUMBERS LOCAL UNION 27
Affilliation: I am the Medical Gas Instructor for Plumbers Local Union #27
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 03 17:47:54 EDT 2015

Committee Statement

Resolution: The submitted public input does not provide any specific language to solve the issue that is in question. A specific suggestion would be entertained at the public comment stage.

Public Input No. 118-NFPA 99-2015 [Section No. 5.1.3.5.7 [Excluding any Sub-Sections]]

All ~~source~~ central supply systems sources shall be provided with an auxiliary source connection point of the same size as the main line, which shall be located immediately on the patient side of the source valve.

Statement of Problem and Substantiation for Public Input

The term Central Supply systems is quite important in using Chapter 5, but it is never formally defined. The term central supply system is used as is the term "Supply Source" but the usage is not entirely consistent. The proposal attempts to improve this.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 112-NFPA 99-2015 [New Section after 3.3.22]	Parent

Submitter Information Verification

Submitter Full Name: MARK ALLEN
Organization: BEACON MEDAES
Street Address:
City:
State:
Zip:
Submittal Date: Mon May 25 10:19:40 EDT 2015

Committee Statement

Resolution: FR-601-NFPA 99-2015
Statement: terminology

Public Input No. 335-NFPA 99-2015 [Section No. 5.1.3.5.7.1]

5.1.3.5.7.1

The connection shall consist of a tee, a valve, and a ~~removable~~ plug or cap.

Statement of Problem and Substantiation for Public Input

The word removable is to vague.

Submitter Information Verification

Submitter Full Name: Anthony Lowe
Organization: Allied Hospital Systems
Street Address:
City:
State:
Zip:
Submittal Date: Fri Jul 03 12:46:53 EDT 2015

Committee Statement

Resolution: The term removable is an important part of this provision. If the word is deleted, then it would be less clear and could allow for caps to be brazed in place which is exactly what this is meant to prohibit.

Public Input No. 119-NFPA 99-2015 [Section No. 5.1.3.5.9.1]

5.1.3.5.9.1

5.1.3.5.9.1 The following central supply systems shall have local signals located at the source equipment:

(1) Manifolds for gas cylinders without reserve supply *(see 5.1.3.5.11)*
(2) Manifolds for gas cylinders with reserve supply
(3) Manifolds for cryogenic liquid containers *(see 5.1.3.5.12)*
(4) Bulk cryogenic liquid systems *(see 5.1.3.5.14)*
(5) In-building emergency reserves *(see 5.1.3.5.16)*
(6) Instrument air headers *(see 5.1.3.5.10)*

Statement of Problem and Substantiation for Public Input

The term Central Supply systems is quite important in using Chapter 5, but it is never formally defined. The term central supply system is used as is the term "Supply Source" but the usage is not entirely consistent. The proposal attempts to improve this.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 112-NFPA 99-2015 [New Section after 3.3.22]	parent

Submitter Information Verification

Submitter Full Name: MARK ALLEN
Organization: BEACON MEDAES
Street Address:
City:
State:
Zip:
Submittal Date: Mon May 25 10:21:22 EDT 2015

Committee Statement

Resolution: FR-601-NFPA 99-2015
Statement: terminology

Public Input No. 139-NFPA 99-2015 [New Section after 5.1.3.5.10]

5.1.3.5.11* Oxygen Concentrator Units

A.5.1.3.5.11 (See drawing)

5.1.3.5.11.1 Oxygen concentrators units for use with medical gas pipelines shall produce oxygen meeting the requirements of Oxygen 93 USP or Oxygen USP.

5.1.3.5.11.2 Output less than or equal to 1 mg/m3 (6.85 x 10-7 lb/yd3) of permanent particulates sized 1 micron or larger at normal atmospheric pressure.

5.1.3.5.11.3 Materials of construction on the air side of the oxygen concentrator unit shall be suitable for the service as determined by the manufacturer.

5.1.3.5.11.4 Materials of construction on the oxygen side of the oxygen concentrator unit shall comply with 5.1.3.5.4.

5.1.3.5.11.5 The components comprising the oxygen concentrator unit shall be as follows:

(1) the manufacturer of the concentrator unit shall be permitted to use such components and arrangement of such components as needed to produce oxygen complying with 5.1.3.5.11.1 in the quantity as required by the facility, except where otherwise specifically defined in this Code,

(2) air receivers and oxygen accumulators, where used, shall comply with Section VIII "Unfired Pressure Vessels" of the ASME Boiler and Pressure Vessels Code and be provided with overpressure relief valves.

5.1.3.5.11.6 Air Source. The supply air to the concentrators shall be of a quality to ensure the oxygen concentrator unit can produce oxygen complying with 5.1.3.5.11.1 and shall not be subject to reasonably anticipated contamination (e.g. vehicle or other exhausts, gas leakage, discharge from vents, flooding, etc.)

5.1.3.5.11.7 The oxygen concentrator unit and any associated electrical equipment shall be provided at least with the following electrical components:

(1) Either a disconnect switch for each major electrical component or a single disconnect which inactivates all electrical components in the concentrator unit,

(2) Motor starting devices with overload protection for any component with an electrical motor over 2 Hp.

5.1.3.5.11.8 A vent valve shall be provided as follows:

(1) Located source side of the concentrator outlet isolation valve to permit the operation of the oxygen concentrator unit for validation, calibration and testing while the unit is isolated from the pipeline system,

(2) Sized to allow for at least 25% of the oxygen concentrator unit flow,

(3) Venting to a location compliant with 5.1.3.3.3.2.

5.1.3.5.11.9 A DN8 (NPS 1/4) valved sample port shall be provided near the oxygen concentration monitor sensor connection for sampling of the gas from the oxygen concentrator unit

5.1.3.5.11.10 At least one 0.1 micron filter suitable for oxygen service shall be provided at the outlet of the oxygen concentrator unit.

5.1.3.5.11.11 A check valve shall be provided at the outlet of the oxygen concentrator unit to prevent backflow into the oxygen concentrator unit and to allow service to the unit.

5.1.3.5.11.12 An outlet valve shall be provided to isolate all components of the oxygen concentrator from the pipeline with the following characteristics:

(1) the valve shall have both manual and automatic actuation with visual indication of open or closed,

(2) the valve shall close automatically whenever the oxygen concentrator unit is not producing oxygen of a concentration equal to 5.1.3.5.11.1,

(3) Continuing operation of the oxygen concentrator unit through the vent mode shall be permitted with the isolating valve closed,

(4) The isolating valve, when automatically closed due to low concentration, shall require manual reset to ensure the oxygen concentrator unit is examined prior to return to service,

(5) closing the isolating valve, whether automatically or manually, shall activate an alarm signal at the master alarms (see 5.1.9.2) indicating that oxygen concentrator unit is disconnected.

5.1.3.5.11.13 The oxygen concentrator unit shall be provided with an oxygen concentration monitor with the following characteristics:

(1) capable of monitoring 99% oxygen concentration with ±0.5% accuracy.

(2) the monitor shall continuously display the oxygen concentration and shall activate local alarm and master alarms per 5.1.3.9.4 (X) when a concentration lower than 91% is observed.

(3) it shall be permitted to insert the monitor into the pipeline without a demand check.

Statement of Problem and Substantiation for Public Input

Proposed 5.1.3.9 will clarify the intent. A typical supply for oxygen from concentrators is composed of three sub-sources, one or two of which are concentrators. This section defines that sub-source.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 135-NFPA 99-2015 [New Section after 5.1.3.8.5]	parent

Submitter Information Verification

Submitter Full Name: MARK ALLEN
Organization: BEACON MEDAES
Street Address:
City:
State:
Zip:
Submittal Date: Mon May 25 12:09:45 EDT 2015

Committee Statement

Resolution: FR-609-NFPA 99-2015
Statement: This new section 5.1.3.9 defines the requirements for oxygen concentrator supplies. A typical supply for oxygen from concentrators is composed of three sub-sources, one or two of which are concentrators. This section defines that sub-source.

Public Input No. 184-NFPA 99-2015 [Section No. 5.1.3.5.11.1]

5.1.3.5.11.1

The manifolds in this category shall be located in accordance with 5.1.3.3.1 and shall meet the following:

(1) If located outdoors, they shall be installed in an enclosure used only for this purpose and sited to comply with minimum distance requirements in NFPA 55, Table 8 .7.3.

(2) If located indoors, they shall be installed within a room used only for enclosure of such manifolds.

Statement of Problem and Substantiation for Public Input

Lead the reader to the table for Minimum Separation Distance Between Portable Cryogenic Containers and Exposures in NFPA 55.

Submitter Information Verification

Submitter Full Name: CORKY BISHOP
Organization: AIRGAS USA LLC
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 10 11:28:44 EDT 2015

Committee Statement

Resolution: FR-615-NFPA 99-2015
Statement: This revision leads the reader to the table for Minimum Separation Distance Between Portable Cryogenic Containers and Exposures in NFPA 55, which will now be extracted into NFPA 99.

Public Input No. 178-NFPA 99-2015 [New Section after 5.1.3.5.11.2]

TITLE OF NEW CONTENT

Type your content here ...5.1.3.5.11.2 The manifolds in this category shall have their primary and secondary headers located in the same enclosure.

Statement of Problem and Substantiation for Public Input

This is not stated as a requirement in the current code for cylinder manifolds. It is stated in the current code for cryogenic manifolds. This would improve safety by prohibiting an installation where the cylinder headers are not in the same room as the manifold control cabinet.

Submitter Information Verification

Submitter Full Name: JAMES LUCAS
Organization: TRI-TECH MEDICAL INC
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jun 04 15:34:58 EDT 2015

Committee Statement

Resolution: FR-616-NFPA 99-2015
Statement: This was not stated as a requirement in the current code for cylinder manifolds. It is stated in the current code for cryogenic manifolds. This improves safety by prohibiting an installation where the cylinder headers are not in the same room as the manifold control cabinet.

Public Input No. 185-NFPA 99-2015 [Section No. 5.1.3.5.12.1]

5.1.3.5.12.1

Manifolds for cryogenic liquid containers shall be located in accordance with 5.1.3.3.1 and shall meet the following:

(1) If located outdoors, they shall be installed in an enclosure used only for the enclosure of such containers . ~~*[See Figure A.5.1.3.5.14(a) for minimum siting distance requirements.]*~~ and sited to comply with minimum distance requirements in NFPA 55, Table 8.7.3.

(2) If located indoors, they shall be installed within a room used only for the enclosure of such containers.

Statement of Problem and Substantiation for Public Input

Lead the reader to the table for Minimum Separation Distance Between Portable Cryogenic Containers and Exposures in NFPA 55. This is more appropriate than the diagram that describes minimum separation distances between permanently installed bulk liquid oxygen systems and exposure hazards.

Submitter Information Verification

Submitter Full Name: CORKY BISHOP
Organization: AIRGAS USA LLC
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 10 11:41:10 EDT 2015

Committee Statement

Resolution: FR-617-NFPA 99-2015
Statement: Extracts the table for Minimum Separation Distance Between Portable Cryogenic Containers and Exposures in NFPA 55. This is the appropriate than the diagram that describes minimum separation distances between permanently installed bulk liquid oxygen systems and exposure hazards and it will be beneficial to have it contained in NFPA 99.

Public Input No. 180-NFPA 99-2015 [Section No. 5.1.3.5.12.4]

5.1.3.5.12.4

The manifolds in this category shall consist of the following:

(1) Two equal headers per 5.1.3.5.10, each having sufficient vaporization capacity to meet the required peak flow rate and each having sufficient number of liquid container connections for an average day's supply, and with the headers connected to the final line pressure regulator assembly in such a manner that either header can supply the system

(2) Reserve header per 5.1.3.5.10 having sufficient number of gas cylinder connections for an average day's supply, but not fewer than three connections, and connected downstream of the primary/secondary headers and upstream of the final line pressure regulators

(3) Pressure relief installed downstream of the connection of the reserve header and upstream of the final line pressure regulating assembly and set at 50 percent above the nominal inlet pressure

Statement of Problem and Substantiation for Public Input

The current code addresses volume but ignores flow capacity. This change adds the needed requirement for flow capacity to also be addressed in the design and construction of the system.

Submitter Information Verification

Submitter Full Name: JAMES LUCAS
Organization: TRI-TECH MEDICAL INC
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jun 04 16:04:48 EDT 2015

Committee Statement

Resolution: FR-618-NFPA 99-2015
Statement: The current code addresses volume but ignores flow capacity. This change adds the needed requirement for flow capacity to also be addressed in the design and construction of the system.

Public Input No. 120-NFPA 99-2015 [Section No. 5.1.3.5.13]

5.1.3.5.13 Micro-Bulk or Small Bulk Cryogenic Liquid Central Supply Systems.

5.1.3.5.13.1

Micro-bulk cryogenic liquid systems shall comply with the following requirements:

(1) If located indoors, be installed within a room used only for this purpose.

(2) If located outdoors, oxygen systems be sited to comply with the minimum distance requirements in NFPA 55.

(3) If located outdoors, nitrogen systems be sited to comply with the mandatory minimum distance requirements in CGA P-18, *Standard for Bulk Inert Gas Systems at Consumer Sites*.

(4) Be compliant with the mandatory requirements of CGA M-1, *Guide for Medical Gas Installations at Consumer Sites*.

(5) Be located in an enclosure constructed in accordance with 5.1.3.3.2(1) through 5.1.3.3.2(3) and 5.1.3.3.2(5), 5.1.3.3.2(8), and 5.1.3.3.2(9).

(6) Be located in an enclosure ventilated in accordance with 5.1.3.3.3.3.

(7) Be designed such that the items noted in 5.1.3.5.13.2 and items located in the trailer unloading area are readily visible to delivery personnel during filling operations.

(8) Be protected against overpressurization of the pressure vessel during filling operations.

(9) Not have a bottom fill valve.

(10) Be installed in accordance with 5.1.10.1 through 5.1.10.5.1.7.

(11) Be installed by personnel qualified to meet the mandatory requirements of CGA M-1, *Guide for Medical Gas Installations at Consumer Sites*, or ASSE 6015 *Professional Qualifications Standards for Bulk Medical Gas Systems Installers*.

(12) Be installed in compliance with Food and Drug Administration (FDA) Current Good Manufacturing Practices as found in 21 CFR 210 and 21 CFR 211.

5.1.3.5.13.2

A micro-bulk cryogenic liquid system with a primary and secondary supply shall have headers located in the same enclosure.

5.1.3.5.13.3*

A micro-bulk cryogenic liquid system with a reserve header shall be permitted to be located in the same enclosure as the primary and secondary headers or in another enclosure compliant with 5.1.3.5.13.1.

5.1.3.5.13.4

A micro-bulk cryogenic liquid system shall consist of the following:

(1) Two equal headers each having sufficient capacity for an average day's supply, with either being capable of either role, consisting of one primary supply and one secondary supply, and with the headers connected to the final line pressure regulator assembly in such a manner that either header can supply the system and a reserve header, in accordance with 5.1.3.5.10, having sufficient number of gas cylinder connections for an average day's supply but not fewer than three, and connected downstream of the primary/secondary headers and upstream of the final line pressure regulators.

(2) One micro-bulk cryogenic liquid main header, having sufficient capacity for an average day's supply, one secondary supply consisting of a micro-bulk cryogenic liquid, liquid containers, or high-pressure cylinders and having sufficient capacity for an average day's supply, and a reserve header, in accordance with 5.1.3.5.10, having sufficient number of gas cylinder connections for an average day's supply but not fewer than three, and connected downstream of the primary/secondary headers and upstream of the final line pressure regulators.

(3) One micro-bulk cryogenic liquid main header, having sufficient capacity for an average day's supply, one reserve header consisting of either a micro-bulk cryogenic liquid supply or high-pressure cylinders in accordance with 5.1.3.5.10 connections for an average day's supply and connected downstream of the primary/secondary headers and upstream of the final line pressure regulators.

5.1.3.5.13.5

Conditions for the micro-bulk cryogenic system shall include the following:

(1) When the primary or main header is supplying the system, the secondary and reserve headers is prevented from supplying the system.

(2) When the primary or main header is depleted, the roles of primary or main, the secondary (when installed), and the reserve headers alternate and will provide an operating cascade (primary-secondary-reserve) that automatically begins to supply the system.

(3) Capacity be determined after consideration of the customer usage requirements, delivery schedules, proximity of the facility to alternative supplies, and the emergency plan.

(4) Where there are two or more micro-bulk cryogenic liquid vessels of equal capacity, they are permitted to alternate in the roles of primary and secondary.

(5) A reserve supply sized for a greater than an average day's supply and the appropriate size of vessel or number of cylinders shall be determined after consideration of delivery schedules, proximity of the facility to alternative supplies, and the facility's emergency plan.

(6) At least two main vessel relief valves and rupture discs shall be installed downstream of a three-way (three-port) valve.

(7) A check valve shall be located in the primary supply piping upstream of the intersection with a secondary supply or reserve supply.

(8) A contents gauge shall be on each main vessel.

(9) A pressure relief shall be installed downstream of the connection of the reserve header and upstream of the final line pressure regulating assembly and set at 50 percent above the nominal inlet pressure.

(10) The manifolds in this category shall be equipped with a means to conserve the gas produced by evaporation of the cryogenic liquid in the secondary header (where so provided). This mechanism shall discharge the conserved gas into the system upstream of the final line regulator assembly.

(11) The manifolds for two equal headers shall include a manual or automatic means to place either header into the role as primary header and the other in the role of secondary header (where so provided).

(12) The manifolds for main supply with a secondary supply (where so provided) headers shall include a manual or automatic means to place the secondary header into the role as primary header during the filling of the main supply.

(13) The manifolds shall include a means to automatically actuate the reserve header if for any reason the primary and secondary (where so provided) headers cannot supply the system.

(14) Permanent anchors shall hold the components to the pad or flooring in accordance with the design requirements.

5.1.3.5.13.6

The micro-bulk cryogenic system in this category shall actuate a local signal and shall activate an indicator at all master alarms under the following conditions:

(1) When or at a predetermined set point before the main or primary supply reaches an average day's supply, indicating low contents

(2) If the secondary supply is a cryogenic vessel, when or at a predetermined set point before the secondary supply reaches an average day's supply, indicating low contents

(3) If the reserve supply is a cryogenic vessel, when or at a predetermined set point before the reserve supply reaches an average day's supply, indicating low contents

(4) Where there is more than one main supply vessel, when or at a predetermined set point before the secondary supply begins to supply the system, indicating changeover

(5) When or at a predetermined set point before the reserve supply begins to supply the system, indicating reserve is in use

(6) When or at a predetermined set point before the reserve supply contents fall to one day's average supply, indicating reserve low

(7) If the reserve is a cryogenic vessel, when or at a predetermined set point before the reserve internal pressure falls too low for the reserve to operate properly, indicating reserve failure

Statement of Problem and Substantiation for Public Input

The term Central Supply systems is quite important in using Chapter 5, but it is never formally defined. The term central supply system is used as is the term "Supply Source" but the usage is not entirely consistent. The proposal attempts to improve this.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 112-NFPA 99-2015 [New Section after 3.3.22]	parent

Submitter Information Verification

Submitter Full Name: MARK ALLEN
Organization: BEACON MEDAES
Street Address:
City:
State:
Zip:
Submittal Date: Mon May 25 10:23:00 EDT 2015

Committee Statement

Resolution: FR-601-NFPA 99-2015
Statement: terminology

Public Input No. 207-NFPA 99-2015 [Section No. 5.1.3.5.13]

5.1.3.5.13 – Micro-Bulk or Small Bulk Cryogenic Liquid Systems.

5.1.3.5.13.1 –

Micro-bulk cryogenic liquid systems shall comply with the following requirements:

(1) - If located indoors, be installed within a room used only for this purpose.

(2) - If located outdoors, oxygen systems be sited to comply with the minimum distance requirements in NFPA 55.

(3) - If located outdoors, nitrogen systems be sited to comply with the mandatory minimum distance requirements in CGA P-18, *Standard for Bulk Inert Gas Systems at Consumer Sites* .

(4) - Be compliant with the mandatory requirements of CGA M-1, *Guide for Medical Gas Installations at Consumer Sites* .

(5) - Be located in an enclosure constructed in accordance with 5.1.3.3.2(1) through 5.1.3.3.2(3) and 5.1.3.3.2(5) , 5.1.3.3.2(8) , and 5.1.3.3.2(9) .

(6) - Be located in an enclosure ventilated in accordance with 5.1.3.3.3 .

(7) - Be designed such that the items noted in 5.1.3.5.13.2 and items located in the trailer unloading area are readily visible to delivery personnel during filling operations.

(8) - Be protected against overpressurization of the pressure vessel during filling operations.

(9) - Not have a bottom fill valve.

(10) - Be installed in accordance with 5.1.10.1 through 5.1.10.5.1.7 .

(11) - Be installed by personnel qualified to meet the mandatory requirements of CGA M-1, *Guide for Medical Gas Installations at Consumer Sites* , or ASSE 6015 *Professional Qualifications Standards for Bulk Medical Gas Systems Installers* .

(12) - Be installed in compliance with Food and Drug Administration (FDA) Current Good Manufacturing Practices as found in 21 CFR 210 and 21 CFR 211.

5.1.3.5.13.2 –

A micro-bulk cryogenic liquid system with a primary and secondary supply shall have headers located in the same enclosure.

5.1.3.5.13.3 * - –

A micro-bulk cryogenic liquid system with a reserve header shall be permitted to be located in the same enclosure as the primary and secondary headers or in another enclosure compliant with 5.1.3.5.13.1 .

5.1.3.5.13.4 –

A micro-bulk cryogenic liquid system shall consist of the following:

(1) - Two equal headers each having sufficient capacity for an average day's supply, with either being capable of either role, consisting of one primary supply and one secondary supply, and with the headers connected to the final line pressure regulator assembly in such a manner that either header can supply the system and a reserve header, in accordance with 5.1.3.5.10 , having sufficient number of gas cylinder connections for an average day's supply but not fewer than three, and connected downstream of the primary/secondary headers and upstream of the final line pressure regulators.

(2) - One micro-bulk cryogenic liquid main header, having sufficient capacity for an average day's supply, one secondary supply consisting of a micro-bulk cryogenic liquid, liquid containers, or high-pressure cylinders and having sufficient capacity for an average day's supply, and a reserve header, in accordance with 5.1.3.5.10 , having sufficient number of gas cylinder connections for an average day's supply but not fewer than three, and connected downstream of the primary/secondary headers and upstream of the final line pressure regulators.

(3) - One micro-bulk cryogenic liquid main header, having sufficient capacity for an average day's supply, one reserve header consisting of either a micro-bulk cryogenic liquid supply or high-pressure cylinders in accordance with 5.1.3.5.10 connections for an average day's supply and connected downstream of the primary/secondary headers and upstream of the final line pressure regulators.

~~5.1.3.5.13.5~~ –

~~Conditions for the micro-bulk cryogenic system shall include the following:~~

(1) ~~- When the primary or main header is supplying the system, the secondary and reserve headers is prevented from supplying the system.~~

(2) ~~- When the primary or main header is depleted, the roles of primary or main, the secondary (when installed), and the reserve headers alternate and will provide an operating cascade (primary-secondary-reserve) that automatically begins to supply the system.~~

(3) ~~- Capacity be determined after consideration of the customer usage requirements, delivery schedules, proximity of the facility to alternative supplies, and the emergency plan.~~

(4) ~~- Where there are two or more micro-bulk cryogenic liquid vessels of equal capacity, they are permitted to alternate in the roles of primary and secondary.~~

(5) ~~- A reserve supply sized for a greater than an average day's supply and the appropriate size of vessel or number of cylinders shall be determined after consideration of delivery schedules, proximity of the facility to alternative supplies, and the facility's emergency plan.~~

(6) ~~- At least two main vessel relief valves and rupture discs shall be installed downstream of a three-way (three-port) valve.~~

(7) ~~- A check valve shall be located in the primary supply piping upstream of the intersection with a secondary supply or reserve supply.~~

(8) ~~- A contents gauge shall be on each main vessel.~~

(9) ~~- A pressure relief shall be installed downstream of the connection of the reserve header and upstream of the final line pressure regulating assembly and set at 50 percent above the nominal inlet pressure.~~

(10) ~~- The manifolds in this category shall be equipped with a means to conserve the gas produced by evaporation of the cryogenic liquid in the secondary header (where so provided). This mechanism shall discharge the conserved gas into the system upstream of the final line regulator assembly.~~

(11) ~~- The manifolds for two equal headers shall include a manual or automatic means to place either header into the role as primary header and the other in the role of secondary header (where so provided).~~

(12) ~~- The manifolds for main supply with a secondary supply (where so provided) headers shall include a manual or automatic means to place the secondary header into the role as primary header during the filling of the main supply.~~

(13) ~~- The manifolds shall include a means to automatically actuate the reserve header if for any reason the primary and secondary (where so provided) headers cannot supply the system.~~

(14) ~~- Permanent anchors shall hold the components to the pad or flooring in accordance with the design requirements.~~

~~5.1.3.5.13.6~~ –

~~The micro-bulk cryogenic system in this category shall actuate a local signal and shall activate an indicator at all master alarms under the following conditions:~~

(1) ~~- When or at a predetermined set point before the main or primary supply reaches an average day's supply, indicating low contents~~

(2) ~~- If the secondary supply is a cryogenic vessel, when or at a predetermined set point before the secondary supply reaches an average day's supply, indicating low contents~~

(3) ~~- If the reserve supply is a cryogenic vessel, when or at a predetermined set point before the reserve supply reaches an average day's supply, indicating low contents~~

(4) ~~- Where there is more than one main supply vessel, when or at a predetermined set point before the secondary supply begins to supply the system, indicating changeover~~

(5) ~~- When or at a predetermined set point before the reserve supply begins to supply the system, indicating reserve is in use~~

(6) ~~- When or at a predetermined set point before the reserve supply contents fall to one day's average supply, indicating reserve low~~

(7) ~~- If the reserve is a cryogenic vessel, when or at a predetermined set point before the reserve internal pressure falls too low for the reserve to operate properly, indicating reserve failure~~

Statement of Problem and Substantiation for Public Input

Delete in its entirety Section 5.1.3.5.13 and rename Section 5.1.3.5.14 to Cryogenic Fluid Supply Systems. The requirements for stationary microbulk and bulk are identical and there is no need for two separate sections. This will provide guidance for the AHJ.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 203-NFPA 99-2015 [Section No. 5.1.3.5.14]	

Submitter Information Verification

Submitter Full Name: KAREN KOENIG
Organization: CGA
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 16 08:38:33 EDT 2015

Committee Statement

Resolution: FR-627-NFPA 99-2015
Statement: Section 5.1.3.5.13 has been deleted in its entirety and Section 5.1.3.5.14 was renamed to Cryogenic Fluid Supply Systems. The requirements for stationary microbulk and bulk are identical and there is no need for two separate sections. This will provide guidance for the AHJ. Also see the revised definitions in Chapter 3.

Public Input No. 121-NFPA 99-2015 [Section No. 5.1.3.5.14]

5.1.3.5.14* Bulk Cryogenic Liquid Central Supply Systems.

5.1.3.5.14.1

Bulk cryogenic liquid storage systems shall be in accordance with NFPA 55, *Compressed Gases and Cryogenic Fluids Code*.

5.1.3.5.14.2

Bulk cryogenic liquid systems shall have the following protections:

(1) Be installed in accordance with NFPA 55, *Compressed Gases and Cryogenic Fluids Code*

(2) Meet the requirements of 5.1.3.3.2 (1)

(3) Meet the requirements of 5.1.3.3.2 (10)

(4) Meet the requirements of 5.1.3.3.2 (12)

(5) Be installed meeting the requirements in 5.1.10.1 through 5.1.10.4.7

(6) Have a minimum work space clearance of 3 ft (1 m) around the storage container, vaporizer(s), and the cabinet opening or front side of the pressure regulating manifold for system maintenance and operation

5.1.3.5.14.3

Bulk cryogenic liquid sources shall include automatic means to provide the following functions:

(1) When the main supply is supplying the system, the reserve supply shall be prevented from supplying the system until the main supply is reduced to a level at or below the reserve activation pressure.

(2) When the main supply cannot supply the system, the reserve supply shall automatically begin to supply the system.

(3) Where there is more than one main supply vessel, the system shall operate as described in 5.1.3.5.12 for primary, secondary, and reserve operation.

(4) Where there are two or more cryogenic vessels, they shall be permitted to alternate (e.g., on a timed basis) in the roles of primary, secondary, and reserve, provided that an operating cascade (primary–secondary–reserve) as required in 5.1.3.5.12.5 is maintained at all times.

(5) Where a cryogenic vessel is used as the reserve, the reserve vessel shall include a means to conserve the gas produced by evaporation of the cryogenic liquid in the reserve vessel and to discharge the gas into the line upstream of the final line regulator assembly as required by 5.1.3.5.12.6.

5.1.3.5.14.4*

The bulk systems shall have a local signal that visibly indicates the operating status of the equipment and an indicator at all master alarms under the following conditions:

(1) When or at a predetermined set point before the main supply reaches an average day's supply, indicating low contents

(2) When or at a predetermined set point before the reserve supply begins to supply the system, indicating reserve is in use

(3) When or at a predetermined set point before the reserve supply contents fall to one day's average supply, indicating reserve low

(4) If the reserve is a cryogenic vessel, when or at a predetermined set point before the reserve internal pressure falls too low for the reserve to operate properly, indicating reserve failure

(5) Where there is more than one main supply vessel, when or at a predetermined set point before the secondary vessel begins to supply the system, indicating changeover

Statement of Problem and Substantiation for Public Input

The term Central Supply systems is quite important in using Chapter 5, but it is never formally defined. The term central supply system is used as is the term "Supply Source" but the usage is not entirely consistent. The proposal attempts to improve this.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 112-NFPA 99-2015 [New Section after 3.3.22]	parent

Submitter Information Verification

Submitter Full Name: MARK ALLEN
Organization: BEACON MEDAES
Street Address:

City:
State:
Zip:
Submittal Date: Mon May 25 10:24:31 EDT 2015

Committee Statement

Resolution: FR-601-NFPA 99-2015
Statement: terminology

Public Input No. 203-NFPA 99-2015 [Section No. 5.1.3.5.14]

5.1.3.5.14 * ~~Bulk~~ Cryogenic ~~Liquid~~ Fluid Supply Systems.

5.1.3.5.14.1

~~Bulk cryogenic liquid storage~~ Cryogenic fluid supply systems shall be in accordance with NFPA 55, *Compressed Gases and Cryogenic Fluids Code*.

5.1.3.5.14.2

~~Bulk cryogenic liquid systems~~ Cryogenic fluid supply systems shall have the following protections:

(1) Be installed in accordance with NFPA 55, *Compressed Gases and Cryogenic Fluids Code*

(2) Meet the requirements of 5.1.3.3.2 (1)

(3) Meet the requirements of 5.1.3.3.2 (10)

(4) Meet the requirements of 5.1.3.3.2 (12)

(5) Be installed meeting the requirements in 5.1.10.1 through 5.1.10.4.7

(6) Have a minimum work space clearance of 3 ft (1 m) around the storage container, vaporizer(s), and the cabinet opening or front side of the pressure regulating manifold for system maintenance and operation

5.1.3.5.14.3

~~Bulk cryogenic liquid~~ Cryogenic fluid supply sources shall include automatic means to provide the following functions:

(1) When the main supply is supplying the system, the reserve supply shall be prevented from supplying the system until the main supply is reduced to a level at or below the reserve activation pressure.

(2) When the main supply cannot supply the system, the reserve supply shall automatically begin to supply the system.

(3) Where there is more than one main supply vessel, the system shall operate as described in 5.1.3.5.12 for primary, secondary, and reserve operation.

(4) Where there are two or more cryogenic vessels, they shall be permitted to alternate (e.g., on a timed basis) in the roles of primary, secondary, and reserve, provided that an operating cascade (primary–secondary–reserve) as required in 5.1.3.5.12.5 is maintained at all times.

(5) Where a cryogenic vessel is used as the reserve, the reserve vessel shall include a means to conserve the gas produced by evaporation of the cryogenic liquid in the reserve vessel and to discharge the gas into the line upstream of the final line regulator assembly as required by 5.1.3.5.12.6.

5.1.3.5.14.4 *

The ~~bulk~~ cryogenic fluid supply systems shall have a local signal that visibly indicates the operating status of the equipment and an indicator at all master alarms under the following conditions:

(1) When or at a predetermined set point before the main supply reaches an average day's supply, indicating low contents

(2) When or at a predetermined set point before the reserve supply begins to supply the system, indicating reserve is in use

(3) When or at a predetermined set point before the reserve supply contents fall to one day's average supply, indicating reserve low

(4) If the reserve is a cryogenic vessel, when or at a predetermined set point before the reserve internal pressure falls too low for the reserve to operate properly, indicating reserve failure

(5) Where there is more than one main supply vessel, when or at a predetermined set point before the secondary vessel begins to supply the system, indicating changeover

Statement of Problem and Substantiation for Public Input

Delete in its entirety Section 5.1.3.5.13, rename Section 5.1.3.5.14 to Cryogenic Fluid Supply Systems, and throughout Section 5.1.3.5.14 replace “bulk cryogenic” with “cryogenic fluid supply”. Reason: The requirements for stationary micro bulk and bulk are identical and there is no need for two separate sections. This will provide guidance for the AHJ.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 207-NFPA 99-2015 [Section No. 5.1.3.5.13]	

Submitter Information Verification

Submitter Full Name: KAREN KOENIG

Organization: CGA
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jun 15 15:49:48 EDT 2015

Committee Statement

Resolution: FR-626-NFPA 99-2015

Statement: Section 5.1.3.5.13 was completely deleted and Section 5.1.3.5.14 has been revised to Cryogenic Fluid Supply Systems, and throughout Section 5.1.3.5.14 “bulk cryogenic” was replaced with “cryogenic fluid supply”. The requirements for stationary micro bulk and bulk are identical and there is no need for two separate sections. This will provide guidance for the AHJ. See also, the revised definitions in Chapter 3.

Items (2), (3), and (4) were deleted because they are included in section 5.1.3.3, central supply systems, all of whose requirements are used for supply systems when appropriate. A reference to CGA M-1 for piping requirements has been added to be consistent with NFPA 55.

Public Input No. 201-NFPA 99-2015 [Section No. 5.1.3.5.14.2]

5.1.3.5.14.2

Bulk cryogenic liquid systems shall have the following protections:

(1) Be installed in accordance with NFPA 55, *Compressed Gases and Cryogenic Fluids Code*

(2) ~~Meet the requirements of 5.1.3.3.2 (1)~~

(3) ~~Meet the requirements of 5.1.3.3.2 (10)~~

(4) ~~Meet the requirements of 5.1.3.3.2 (12)~~

(5) ~~Be installed meeting the requirements in 5.1.10.1 through 5.1.10.4.7~~ Be installed in accordance with the mandatory requirements found in CGA M-1, *Standard for Medical Gas Supply Systems at Health Care Facilities* .

(6) Have a minimum work space clearance of 3 ft (1 m) around the storage container, vaporizer(s), and the cabinet opening or front side of the pressure regulating manifold for system maintenance and operation

Statement of Problem and Substantiation for Public Input

Delete items (2), (3), and (4) because they are included in section 5.1.3.3, central supply systems, all of whose requirements are used for supply systems when appropriate. There is no need to refer to specific sections when the general section applies. Add new language to item (5) pointing to CGA M-1 for piping requirements to be consistent with NFPA 55.

Submitter Information Verification

Submitter Full Name: KAREN KOENIG
Organization: CGA
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jun 15 15:35:43 EDT 2015

Committee Statement

Resolution: FR-626-NFPA 99-2015

Statement: Section 5.1.3.5.13 was completely deleted and Section 5.1.3.5.14 has been revised to Cryogenic Fluid Supply Systems, and throughout Section 5.1.3.5.14 “bulk cryogenic” was replaced with “cryogenic fluid supply”. The requirements for stationary micro bulk and bulk are identical and there is no need for two separate sections. This will provide guidance for the AHJ. See also, the revised definitions in Chapter 3.

Items (2), (3), and (4) were deleted because they are included in section 5.1.3.3, central supply systems, all of whose requirements are used for supply systems when appropriate. A reference to CGA M-1 for piping requirements has been added to be consistent with NFPA 55.

Public Input No. 423-NFPA 99-2015 [Section No. 5.1.3.5.15.2]

5.1.3.5.15.2

EOSCs shall consist of the following:

(1) Physical protection to prevent unauthorized tampering

(2) Female DN (NPS) inlet for connection of the emergency oxygen source that is sized for 100 percent of the system demand at the emergency source gas pressure

(3) Manual shutoff valve inside the EOSC enclosure to isolate the EOSC when not in use

(4) Manual shutoff valve inside the building to isolate the pipeline distribution system from the EOSC connection when not in use

(5) Two check valves, one downstream of the EOSC and one downstream of the main line shutoff valve, with both upstream from the tee connection for the two pipelines

(6) Relief valve sized to protect the downstream piping system and related equipment from exposure to pressures in excess of 50 percent higher than normal line pressure

(7) Any valves necessary to allow connection of an emergency supply of oxygen and isolation of the piping to the normal source of supply

(8) Minimum of 1 m (3 ft) of clearance around the EOSC for connection of temporary auxiliary source

Additional Proposed Changes

File Name	Description	Approved
A.5.1.3.5.15	Piping Detail	

Statement of Problem and Substantiation for Public Input

This would prevent the unauthorized use of the EOSC and the possibility of intentionally or unintentionally contaminating the system. It will also allow for the relocation of the EOSC in the future without the need for a system shutdown.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 424-NFPA 99-2015 [Section No. A.5.1.3.5.15]	

Submitter Information Verification

Submitter Full Name: JONATHAN WILLARD
Organization: ACUTE MEDICAL GAS SERVICES
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 12:15:25 EDT 2015

Committee Statement

Resolution: This would introduce an additional valve that could result in the EOSC being shutoff in a non-obvious manner. The specification that the shutoff valve be located inside the enclosure is not needed because it is a design decision. The diagram in the annex shows it this way.

Public Input No. 122-NFPA 99-2015 [Section No. 5.1.3.6]

5.1.3.6* Category 1 Medical Air Central Supply Systems.

5.1.3.6.1* Quality of Medical Air.

Medical air shall be required to have the following characteristics:

(1) It shall be supplied from cylinders, bulk containers, or medical air compressor sources, or it shall be reconstituted from oxygen USP and oil-free, dry nitrogen NF.

(2) It shall meet the requirements of medical air USP.

(3) It shall have no detectable liquid hydrocarbons.

(4) It shall have less than 25 ppm gaseous hydrocarbons.

(5) It shall have equal to or less than 1 mg/m^3 (6.85×10^{-7} lb/yd^3) of permanent particulates sized 1 micron or larger in the air at normal atmospheric pressure.

5.1.3.6.2* Uses of Medical Air.

Medical air sources shall be connected to the medical air distribution system only and shall be used only for air in the application of human respiration and calibration of medical devices for respiratory application.

5.1.3.6.3* Medical Air Compressor Sources.

5.1.3.6.3.1 Location.

Medical air compressor systems shall be located per 5.1.3.3 as follows:

(1) Indoors in a dedicated mechanical equipment area, adequately ventilated and with any required utilities (e.g., electricity, drains, lighting)

(2) In a room ventilated per 5.1.3.3.3.3

(3) For air-cooled equipment, in a room designed to maintain the ambient temperature range as recommended by the manufacturer

5.1.3.6.3.2 Required Components.

Medical air compressor systems shall consist of the following:

(1) Components complying with 5.1.3.6.3.4 through 5.1.3.6.3.8, arranged per 5.1.3.6.3.9

(2) Automatic means to prevent backflow from all on-cycle compressors through all off-cycle compressors

(3) Manual shutoff valve to isolate each compressor from the centrally piped system and from other compressors for maintenance or repair without loss of pressure in the system

(4) Intake filter–muffler(s) of the dry type

(5) Pressure relief valve(s) set at 50 percent above line pressure

(6) Piping and components between the compressor and the source shutoff valve that do not contribute to contaminant levels

(7) Except as defined in 5.1.3.6.3.2 (1) through (6), materials and devices used between the medical air intake and the medical air source valve that are of any design or construction appropriate for the service as determined by the manufacturer

5.1.3.6.3.3 Air Drying Equipment.

Medical air compressor systems shall preclude the condensation of water vapor in the piping distribution system by air drying equipment.

5.1.3.6.3.4 Compressors for Medical Air.

(A)*

Compressors for medical air shall be designed to prevent the introduction of contaminants or liquid into the pipeline by any of the following methods:

(1) Elimination of oil anywhere in the compressor (e.g., liquid ring and permanently sealed bearing compressors)

(2) Reciprocating compressors provided with a separation of the oil-containing section from the compression chamber by at least two seals creating an area open to atmosphere that allows the following:

(3) _ Direct and unobstructed visual inspection of the interconnecting shaft through vent and inspection openings no smaller than 1.5 shaft diameters in size

(4) _ Confirmation by the facility operators of proper seal operation by direct visual inspection through the above-shaft opening, without disassembly of the compressor (e.g., extended head compressors with an atmospheric vent between the compression chamber and the crankcase)

(5) Rotating element compressors provided with a compression chamber free of oil that provide the following:

(6) _ Separation of each oil-containing section from the compression chamber by at least one seal having atmospheric vents on each side with the vent closest to the oil-containing section supplied with a gravity drain to atmosphere

(7) _ Unobstructed visualization of the atmospheric vent(s), closest to each oil-containing section, that is accessible for inspection without disassembling the compressor

(8) _ Entry of the rotating shaft into each compression chamber at a point that is above atmospheric pressure

(9) _ Confirmation by the facility operators of proper seal operation by direct visual inspection of the atmospheric vents

(B)

For liquid ring compressors, service water and seal water shall be treated to control waterborne pathogens and chlorine from hyperchlorination from entering the medical air.

(C)

Liquid ring compressors shall comply with the following:

(1) Service water and seal water of a quality recommended by the compressor manufacturer shall be used.

(2) Reserve medical air standby headers or a backup compressor shall be installed.

(3) When installed, the header shall comply with 5.1.3.5.10.

(4) When installed, the number of attached cylinders shall be sufficient for 1 hour normal operation.

(D)

Compressors shall be constructed of materials deemed suitable by the manufacturer.

(E)

Antivibration mountings shall be installed for compressors as required by equipment dynamics or location and in accordance with the manufacturer's recommendations.

(F)

Flexible connectors shall connect the air compressors with their intake and outlet piping.

5.1.3.6.3.5 Aftercoolers.

(A)

Aftercoolers, where required, shall be provided with individual condensate traps.

(B)

The receiver shall not be used as an aftercooler or aftercooler trap.

(C)

Aftercoolers shall be constructed of materials deemed suitable by the manufacturer.

(D)

Antivibration mountings shall be installed for aftercoolers as required by equipment dynamics or location and in accordance with the manufacturer's recommendations.

5.1.3.6.3.6 Medical Air Receivers.

Receivers for medical air shall meet the following requirements:

(1) They shall be made of corrosion-resistant materials or otherwise be made corrosion resistant.

(2) They shall comply with Section VIII, “Unfired Pressure Vessels,” of the ASME *Boiler and Pressure Vessel Code.*

(3) They shall be equipped with a pressure relief valve, automatic drain, manual drain, sight glass, and pressure indicator.

(4) They shall be of a capacity sufficient to prevent the compressors from short-cycling.

5.1.3.6.3.7 Medical Air Dryers.

Medical air dryers, where required, shall meet the following requirements:

(1) Be designed to provide air at a maximum dew point that is below the frost point [0°C (32°F)] at 345 kPa to 380 kPa (50 psi to 55 psi) at any level of demand

(2) Be sized for 100 percent of the system peak calculated demand at design conditions

(3) Be constructed of materials deemed suitable by the manufacturer

(4) Be provided with antivibration mountings installed as required by equipment dynamics or location and in accordance with the manufacturer's recommendations

5.1.3.6.3.8 Medical Air Filters.

Medical air filters shall meet the following requirements:

(1) Be appropriate for the intake air conditions

(2) Be located upstream (source side) of the final line regulators

(3) Be sized for 100 percent of the system peak calculated demand at design conditions and be rated for a minimum of 98 percent efficiency at 1 micron or greater

(4) Be equipped with a continuous visual indicator showing the status of the filter element life

(5) Be constructed of materials deemed suitable by the manufacturer

5.1.3.6.3.9 Piping Arrangement and Redundancies.

(A)

Component arrangement shall be as follows:

(1) Components shall be arranged to allow service and a continuous supply of medical air in the event of a single fault failure.

(2) Component arrangement shall be permitted to vary as required by the technology(ies) employed, provided that an equal level of operating redundancy and medical air quality is maintained.

(B)

Medical air compressors shall be sufficient to serve the peak calculated demand with the largest single compressor out of service. In no case shall there be fewer than two compressors.

(C)

When aftercoolers are provided, they shall be arranged to meet either one of the following:

(1) Arranged as a duplex or multiplex set, sized to serve the peak calculated demand with the largest single aftercooler out of service, and provided with valves adequate, to isolate any single aftercooler from the system without shutting down supply of medical air

(2) Arranged one per compressor, sized to handle the output of that compressor, and valved as appropriate to allow repair or replacement with that compressor out of service but without shutting down supply of medical air

(D)*

A medical air receiver(s) shall be provided with proper valves to allow the flow of compressed air to enter and exit out of separate receiver ports during normal operation and allow the receiver to be bypassed during service without shutting down the supply of medical air.

(E)

Dryers, filters, and regulators shall be at least duplexed, with each component sized to serve the peak calculated demand with the largest of each component out of service.

(F)*

Dryers, filters, and regulators shall be provided with manual valves upstream and manual valves or check valves downstream to allow service to the components without shutting down the system in either one of the following ways:

(1) They shall be installed for each component, upstream and downstream of each component, allowing each to be individually isolated.

(2) They shall be installed upstream (source side) and downstream of components in series so as to create redundant parallel branches of components.

(G)

A three-way valve (three-port), indexed to flow, full port shall be permitted to be used to isolate one branch or component for the purposes of 5.1.3.6.3.9(C), 5.1.3.6.3.9(D), 5.1.3.6.3.9(E), and 5.1.3.6.3.9(F).

(H)

Under normal operation, only one aftercooler shall be open to airflow with the other aftercooler valved off.

(I)

Under normal operation, only one dryer–filter(s)–regulator sequence shall be open to airflow with the other sequence valved off.

(J)

If the relief valve required in 5.1.3.6.3.2 (5) and 5.1.3.6.3.6 (3) can be isolated from the system by the valve arrangement used to comply with 5.1.3.6.3.9(F), then a redundant relief valve(s) shall be installed in the parallel sequence.

(K)

A DN8 (NPS ¼) valved sample port shall be provided downstream of the final line pressure regulators, dew point monitor, and carbon monoxide monitor and upstream of the source shutoff valve to allow for sampling of the medical air.

(L)

Medical air source systems shall be provided with a source valve per 5.1.4.2.

(M)

Where medical air piping systems at different operating pressures are required, the piping shall separate after the filters but shall be provided with separate line regulators, dew point monitors, relief valves, and source shutoff valves.

5.1.3.6.3.10 Electrical Power and Control.

(A)

An additional compressor(s) shall automatically activate when the compressor(s) in operation is incapable of maintaining the required pressure.

(B)

Automatic or manual alternation of compressors shall allow division of operating time. If automatic alternation of compressors is not provided, the facility staff shall arrange a schedule for manual alternation.

(C)

Each compressor motor shall be provided with electrical components including, but not limited to, the following:

(1) Dedicated disconnect switch installed in the electrical circuit ahead of each motor starter

(2) Motor starting device

(3) Overload protection

(4) Where compressor systems having two or more compressors employ a control transformer or other voltage control power device, installation of at least two such devices

(5) Control circuits arranged in such a manner that the shutdown of one compressor does not interrupt the operation of another compressor

(6) Automatic restart function, such that the compressor(s) will restart after power interruption without manual intervention

(D)

Electrical installation and wiring shall conform to the requirements of *NFPA 70*, *National Electrical Code*.

(E)

Emergency electrical service for the compressors shall conform to the requirements of the essential electrical system as described in Chapter 6.

5.1.3.6.3.11 Compressor Intake.

(A)

The medical air compressors shall draw their air from a source of clean air.

(B)

The medical air intake shall be located a minimum of 7.6 m (25 ft) from ventilating system exhausts, fuel storage vents, combustion vents, plumbing vents, vacuum and WAGD discharges, or areas that can collect vehicular exhausts or other noxious fumes.

(C)

The medical air intake shall be located a minimum of 6 m (20 ft) above ground level.

(D)

The medical air intake shall be located a minimum of 3.0 m (10 ft) from any door, window, or other opening in the building.

(E)

If an air source equal to or better than outside air (e.g., air already filtered for use in operating room ventilating systems) is available, it shall be permitted to be used for the medical air compressors with the following provisions:

(1) This alternate source of supply air shall be available on a continuous 24-hour-per-day, 7-day-per-week basis.

(2) Ventilating systems having fans with motors or drive belts located in the airstream shall not be used as a source of medical air intake.

(F)

Compressor intake piping shall be permitted to be made of materials and use a joining technique as permitted under 5.1.10.2 and 5.1.10.3.

(G)

Air intakes for separate compressors shall be permitted to be joined together to one common intake where the following conditions are met:

(1) The common intake is sized to minimize back pressure in accordance with the manufacturer's recommendations.

(2) Each compressor can be isolated by manual or check valve, blind flange, or tube cap to prevent open inlet piping when the compressor(s) is removed for service from the consequent backflow of room air into the other compressor(s).

(H)

The end of the intake shall be turned down and screened or otherwise be protected against the entry of vermin, debris, or precipitation by screening fabricated or composed of a noncorroding material.

5.1.3.6.3.12 Operating Alarms and Local Signals.

Medical air systems shall be monitored for conditions that can affect air quality during use or in the event of failure, based on the type of compressor(s) used in the system.

(A)

A local alarm complying with 5.1.9.5 shall be provided for the medical air compressor source.

(B)

Where liquid ring air compressors, compressors having water-cooled heads, or water-cooled aftercoolers are used, air receivers shall be equipped with a high water level sensor that shuts down the compressor system and activates a local alarm indicator. *[See 5.1.9.5.4 (7).]*

(C)

Where liquid ring compressors are used, each compressor shall have a liquid level sensor in each air–water separator that, when the liquid level is above the design level, shuts down its compressor and activates a local alarm indicator. *[See 5.1.9.5.4 (8).]*

(D)

Where nonliquid ring compressors compliant with 5.1.3.6.3.4(A) (1) are used, the air temperature at the immediate outlet of each compressor cylinder shall be monitored by a high-temperature sensor that shuts down that compressor and activates a local alarm indicator *[see 5.1.9.5.4 (9)]*. The temperature setting shall be as recommended by the compressor manufacturer.

(E)

Where compressors compliant with 5.1.3.6.3.4(A) (2) and (3) are used, the following requirements shall apply:

(1) The air temperature at the immediate outlet of each compressor chamber shall be monitored by a high-temperature sensor that shuts down that compressor and activates a local alarm indicator *(see 5.1.9.5.4)*, the temperature setting shall be as recommended by the compressor manufacturer.

(2) Coalescing filters with element change indicator shall be provided.

(3) Charcoal absorber shall be provided.

(4) Gaseous hydrocarbons shall be monitored on a quarterly basis.

(F)

When the backup or lag compressor is running, a local alarm shall activate *[see 5.1.9.5.4 (1)]*. This signal shall be manually reset.

5.1.3.6.3.13 Medical Air Quality Monitoring.

Medical air quality shall be monitored downstream of the medical air regulators and upstream of the piping system as follows:

(1) Dew point shall be monitored and shall activate a local alarm and all master alarms when the dew point at system delivery pressure exceeds ± 2°C (± 35°F).

(2) Carbon monoxide shall be monitored and shall activate a local alarm when the CO level exceeds 10 ppm. *[See 5.1.9.5.4 (2).]*

(3) Dew point and carbon monoxide monitors shall activate their individual monitor’s signal at the alarm panels where their signals are required when their power is lost.

5.1.3.6.3.14 Category 1 Medical Air Proportioning System.

(A) General.

(1) Medical air reconstituted from oxygen USP and nitrogen NF, produced using proportioning system(s), shall be required to meet the following:

(2) The quality of medical air shall be in accordance with 5.1.3.6.1 .

(3) The system shall be capable of supplying this quality of medical air, per 5.1.3.6.1 , over the entire range of flow.

(4) The system shall produce medical air with an oxygen content of 19.5 percent to 23.5 percent.

(5) The medical air shall be cleared for marketing by the FDA or approved by the FDA.

(6) The medical air proportioning system shall operate automatically.

(7) The mixture shall be analyzed continuously, and a recording capability shall be provided (e.g., via data port).

(8) The analyzing system specified in 5.1.3.6.3.14(A) (3) shall be a dedicated and an independent analyzer used to control the medical air proportioning system.

(9) If the mixture goes out of specification, an alarm shall be activated automatically, the primary medical air proportioning system shall be disconnected, and the reserve supply shall be activated.

(10) The system shall be arranged such that manual intervention is necessary to correct the composition of the mixture before reconnecting the medical air proportioning system to the health care facility pipeline system.

(11) If dedicated sources of oxygen USP and nitrogen NF supply the medical air proportioning system, reserve sources for the oxygen and nitrogen shall not be required.

(12) If dedicated sources of oxygen USP and nitrogen NF supply the medical air proportioning system, they shall not be used as the reserves for oxygen and nitrogen systems supplying the pipelines of the health care facility.

(13)* If the sources of oxygen USP and nitrogen NF that supply the medical air proportioning system are the same sources that supply the health care facility, engineering controls shall be provided to prevent cross contamination of oxygen and nitrogen supply lines, as provided in 5.1.3.5.8 .

(14) A risk analysis and approval from the authority having jurisdiction shall be required.

(B)

Location. The medical air proportioning system shall be located per 5.1.3.3 as follows:

(1) The medical air proportioning system's supply of oxygen USP and nitrogen NF shall be located per 5.1.3.3 and NFPA 55, as applicable.

(2) The mixing device and controls, analyzers, and receivers shall be located indoors within a room or area per 5.1.3.3.1 .

(3) The indoor location shall include atmospheric monitoring for oxygen concentration.

(4) The indoor location shall be constructed with all required utilities (e.g., electricity, drains, lighting) per *NFPA 5000*.

(5) The indoor location shall be ventilated and heated per Chapter 9 and the manufacturer's recommendations.

(C)

Required Components. The medical air proportioning system shall consist of the following:

(1) Supply of oxygen USP and supply of nitrogen NF as follows:

(2) _ The supply lines shall be filtered to remove particulate entering the proportioning system.

(3) _ The minimum safe supply gas temperature and recommended local signal shall be specified by the medical air proportioning system manufacturer.

(4) Mixing device with analyzers and engineering controls per manufacturer's recommendations to include, as a minimum, the following:

(5) _ At least two oxygen analyzers capable of independently monitoring oxygen concentration

(6) _ Mechanism where each analyzer based upon nonconforming oxygen concentration is capable, directly or via other medical air proportioning system controls, of automatically shutting off the supply from the medical air proportioning system to the medical air piped distribution system and activating the reserve supply

(7) _ Mechanism where each analyzer, based upon nonconforming oxygen concentration, is capable, directly or via other proportioning system controls, of automatically shutting off the supply of oxygen and nitrogen to the proportioning system and activating the reserve supply

(8) _ Provision for manual resetting of the proportioning system after detection of nonconforming oxygen concentration and subsequent shutdown once conforming oxygen concentration is established, in order to re-establish flow to the medical air piping system

(9) _ Means of verifying the performance of the analyzers by reference to an air standard, with known traceable oxygen content

(10) Minimum of one recorder for recording the medical air proportioning system performance and air quality for a period of not less than 24 hours

(11) Continuous analysis of the mixture and a recording capability provided (e.g., via a data port)

(12) Mechanism for isolating the primary medical air proportioning system from the reserve supply and the medical air piping distribution system by employing sequential valves for redundancy

(13) Capability of the reserve supply to automatically activate if the primary supply is isolated

(14) Reserve supply of medical air USP sized, at minimum, for an average day's supply and consisting of one of the following:

(15) _ Additional medical air proportioning unit with a dedicated supply of oxygen USP and nitrogen NF

(16) _ Medical air compressor system per 5.1.3.5.11 , with the exception of the allowance of a simplex medical air compressor system

(17) _ Medical air cylinder manifold per 5.1.3.5.11

(18) Receiver fitted with a pressure relief valve and pressure gauge as follows:

(19) _ The receiver shall be constructed of corrosion-resistant materials.

(20) _ The receiver, relief valves, and pressure gauges shall comply with ASME *Boiler and Pressure Vessel Code* and manufacturer's recommendations.

(21)* Warning systems per 5.1.9, including a local signal and master alarm that indicates nonconforming oxygen concentration per manufacturer's recommendations

(22) Final line pressure regulators complying with 5.1.3.5.5

(23) Pressure relief complying with 5.1.3.5.6

(24) Local signals complying with 5.1.3.5.9.2

Statement of Problem and Substantiation for Public Input

The term Central Supply systems is quite important in using Chapter 5, but it is never formally defined. The term central supply system is used as is the term "Supply Source" but the usage is not entirely consistent. The proposal attempts to improve this.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 112-NFPA 99-2015 [New Section after 3.3.22]	parent

Submitter Information Verification

Submitter Full Name: MARK ALLEN
Organization: BEACON MEDAES
Street Address:
City:
State:
Zip:
Submittal Date: Mon May 25 10:25:35 EDT 2015

Committee Statement

Resolution: FR-601-NFPA 99-2015
Statement: terminology

Public Input No. 123-NFPA 99-2015 [Section No. 5.1.3.6.3]

5.1.3.6.3* Medical Air Compressor Supply Sources.

5.1.3.6.3.1 Location.

Medical air compressor systems shall be located per 5.1.3.3 as follows:

(1) Indoors in a dedicated mechanical equipment area, adequately ventilated and with any required utilities (e.g., electricity, drains, lighting)

(2) In a room ventilated per 5.1.3.3.3.3

(3) For air-cooled equipment, in a room designed to maintain the ambient temperature range as recommended by the manufacturer

5.1.3.6.3.2 Required Components.

Medical air compressor systems shall consist of the following:

(1) Components complying with 5.1.3.6.3.4 through 5.1.3.6.3.8, arranged per 5.1.3.6.3.9

(2) Automatic means to prevent backflow from all on-cycle compressors through all off-cycle compressors

(3) Manual shutoff valve to isolate each compressor from the centrally piped system and from other compressors for maintenance or repair without loss of pressure in the system

(4) Intake filter–muffler(s) of the dry type

(5) Pressure relief valve(s) set at 50 percent above line pressure

(6) Piping and components between the compressor and the source shutoff valve that do not contribute to contaminant levels

(7) Except as defined in 5.1.3.6.3.2 (1) through (6), materials and devices used between the medical air intake and the medical air source valve that are of any design or construction appropriate for the service as determined by the manufacturer

5.1.3.6.3.3 Air Drying Equipment.

Medical air compressor systems shall preclude the condensation of water vapor in the piping distribution system by air drying equipment.

5.1.3.6.3.4 Compressors for Medical Air.

(A)*

Compressors for medical air shall be designed to prevent the introduction of contaminants or liquid into the pipeline by any of the following methods:

(1) Elimination of oil anywhere in the compressor (e.g., liquid ring and permanently sealed bearing compressors)

(2) Reciprocating compressors provided with a separation of the oil-containing section from the compression chamber by at least two seals creating an area open to atmosphere that allows the following:

(3) _ Direct and unobstructed visual inspection of the interconnecting shaft through vent and inspection openings no smaller than 1.5 shaft diameters in size

(4) _ Confirmation by the facility operators of proper seal operation by direct visual inspection through the above-shaft opening, without disassembly of the compressor (e.g., extended head compressors with an atmospheric vent between the compression chamber and the crankcase)

(5) Rotating element compressors provided with a compression chamber free of oil that provide the following:

(6) _ Separation of each oil-containing section from the compression chamber by at least one seal having atmospheric vents on each side with the vent closest to the oil-containing section supplied with a gravity drain to atmosphere

(7) _ Unobstructed visualization of the atmospheric vent(s), closest to each oil-containing section, that is accessible for inspection without disassembling the compressor

(8) _ Entry of the rotating shaft into each compression chamber at a point that is above atmospheric pressure

(9) _ Confirmation by the facility operators of proper seal operation by direct visual inspection of the atmospheric vents

(B)

For liquid ring compressors, service water and seal water shall be treated to control waterborne pathogens and chlorine from hyperchlorination from entering the medical air.

(C)

Liquid ring compressors shall comply with the following:

(1) Service water and seal water of a quality recommended by the compressor manufacturer shall be used.

(2) Reserve medical air standby headers or a backup compressor shall be installed.

(3) When installed, the header shall comply with 5.1.3.5.10.

(4) When installed, the number of attached cylinders shall be sufficient for 1 hour normal operation.

(D)

Compressors shall be constructed of materials deemed suitable by the manufacturer.

(E)

Antivibration mountings shall be installed for compressors as required by equipment dynamics or location and in accordance with the manufacturer's recommendations.

(F)

Flexible connectors shall connect the air compressors with their intake and outlet piping.

5.1.3.6.3.5 Aftercoolers.

(A)

Aftercoolers, where required, shall be provided with individual condensate traps.

(B)

The receiver shall not be used as an aftercooler or aftercooler trap.

(C)

Aftercoolers shall be constructed of materials deemed suitable by the manufacturer.

(D)

Antivibration mountings shall be installed for aftercoolers as required by equipment dynamics or location and in accordance with the manufacturer's recommendations.

5.1.3.6.3.6 Medical Air Receivers.

Receivers for medical air shall meet the following requirements:

(1) They shall be made of corrosion-resistant materials or otherwise be made corrosion resistant.

(2) They shall comply with Section VIII, “Unfired Pressure Vessels,” of the ASME *Boiler and Pressure Vessel Code.*

(3) They shall be equipped with a pressure relief valve, automatic drain, manual drain, sight glass, and pressure indicator.

(4) They shall be of a capacity sufficient to prevent the compressors from short-cycling.

5.1.3.6.3.7 Medical Air Dryers.

Medical air dryers, where required, shall meet the following requirements:

(1) Be designed to provide air at a maximum dew point that is below the frost point [0°C (32°F)] at 345 kPa to 380 kPa (50 psi to 55 psi) at any level of demand

(2) Be sized for 100 percent of the system peak calculated demand at design conditions

(3) Be constructed of materials deemed suitable by the manufacturer

(4) Be provided with antivibration mountings installed as required by equipment dynamics or location and in accordance with the manufacturer's recommendations

5.1.3.6.3.8 Medical Air Filters.

Medical air filters shall meet the following requirements:

(1) Be appropriate for the intake air conditions

(2) Be located upstream (source side) of the final line regulators

(3) Be sized for 100 percent of the system peak calculated demand at design conditions and be rated for a minimum of 98 percent efficiency at 1 micron or greater

(4) Be equipped with a continuous visual indicator showing the status of the filter element life

(5) Be constructed of materials deemed suitable by the manufacturer

5.1.3.6.3.9 Piping Arrangement and Redundancies.

(A)

Component arrangement shall be as follows:

(1) Components shall be arranged to allow service and a continuous supply of medical air in the event of a single fault failure.

(2) Component arrangement shall be permitted to vary as required by the technology(ies) employed, provided that an equal level of operating redundancy and medical air quality is maintained.

(B)

Medical air compressors shall be sufficient to serve the peak calculated demand with the largest single compressor out of service. In no case shall there be fewer than two compressors.

(C)

When aftercoolers are provided, they shall be arranged to meet either one of the following:

(1) Arranged as a duplex or multiplex set, sized to serve the peak calculated demand with the largest single aftercooler out of service, and provided with valves adequate, to isolate any single aftercooler from the system without shutting down supply of medical air

(2) Arranged one per compressor, sized to handle the output of that compressor, and valved as appropriate to allow repair or replacement with that compressor out of service but without shutting down supply of medical air

(D)*

A medical air receiver(s) shall be provided with proper valves to allow the flow of compressed air to enter and exit out of separate receiver ports during normal operation and allow the receiver to be bypassed during service without shutting down the supply of medical air.

(E)

Dryers, filters, and regulators shall be at least duplexed, with each component sized to serve the peak calculated demand with the largest of each component out of service.

(F)*

Dryers, filters, and regulators shall be provided with manual valves upstream and manual valves or check valves downstream to allow service to the components without shutting down the system in either one of the following ways:

(1) They shall be installed for each component, upstream and downstream of each component, allowing each to be individually isolated.

(2) They shall be installed upstream (source side) and downstream of components in series so as to create redundant parallel branches of components.

(G)

A three-way valve (three-port), indexed to flow, full port shall be permitted to be used to isolate one branch or component for the purposes of 5.1.3.6.3.9(C), 5.1.3.6.3.9(D), 5.1.3.6.3.9(E), and 5.1.3.6.3.9(F).

(H)

Under normal operation, only one aftercooler shall be open to airflow with the other aftercooler valved off.

(I)

Under normal operation, only one dryer–filter(s)–regulator sequence shall be open to airflow with the other sequence valved off.

(J)

If the relief valve required in 5.1.3.6.3.2 (5) and 5.1.3.6.3.6 (3) can be isolated from the system by the valve arrangement used to comply with 5.1.3.6.3.9(F), then a redundant relief valve(s) shall be installed in the parallel sequence.

(K)

A DN8 (NPS ¼) valved sample port shall be provided downstream of the final line pressure regulators, dew point monitor, and carbon monoxide monitor and upstream of the source shutoff valve to allow for sampling of the medical air.

(L)

Medical air source systems shall be provided with a source valve per 5.1.4.2.

(M)

Where medical air piping systems at different operating pressures are required, the piping shall separate after the filters but shall be provided with separate line regulators, dew point monitors, relief valves, and source shutoff valves.

5.1.3.6.3.10 Electrical Power and Control.

(A)

An additional compressor(s) shall automatically activate when the compressor(s) in operation is incapable of maintaining the required pressure.

(B)

Automatic or manual alternation of compressors shall allow division of operating time. If automatic alternation of compressors is not provided, the facility staff shall arrange a schedule for manual alternation.

(C)

Each compressor motor shall be provided with electrical components including, but not limited to, the following:

(1) Dedicated disconnect switch installed in the electrical circuit ahead of each motor starter

(2) Motor starting device

(3) Overload protection

(4) Where compressor systems having two or more compressors employ a control transformer or other voltage control power device, installation of at least two such devices

(5) Control circuits arranged in such a manner that the shutdown of one compressor does not interrupt the operation of another compressor

(6) Automatic restart function, such that the compressor(s) will restart after power interruption without manual intervention

(D)

Electrical installation and wiring shall conform to the requirements of *NFPA 70*, *National Electrical Code*.

(E)

Emergency electrical service for the compressors shall conform to the requirements of the essential electrical system as described in Chapter 6.

5.1.3.6.3.11 Compressor Intake.

(A)

The medical air compressors shall draw their air from a source of clean air.

(B)

The medical air intake shall be located a minimum of 7.6 m (25 ft) from ventilating system exhausts, fuel storage vents, combustion vents, plumbing vents, vacuum and WAGD discharges, or areas that can collect vehicular exhausts or other noxious fumes.

(C)

The medical air intake shall be located a minimum of 6 m (20 ft) above ground level.

(D)

The medical air intake shall be located a minimum of 3.0 m (10 ft) from any door, window, or other opening in the building.

(E)

If an air source equal to or better than outside air (e.g., air already filtered for use in operating room ventilating systems) is available, it shall be permitted to be used for the medical air compressors with the following provisions:

(1) This alternate source of supply air shall be available on a continuous 24-hour-per-day, 7-day-per-week basis.

(2) Ventilating systems having fans with motors or drive belts located in the airstream shall not be used as a source of medical air intake.

(F)

Compressor intake piping shall be permitted to be made of materials and use a joining technique as permitted under 5.1.10.2 and 5.1.10.3.

(G)

Air intakes for separate compressors shall be permitted to be joined together to one common intake where the following conditions are met:

(1) The common intake is sized to minimize back pressure in accordance with the manufacturer's recommendations.

(2) Each compressor can be isolated by manual or check valve, blind flange, or tube cap to prevent open inlet piping when the compressor(s) is removed for service from the consequent backflow of room air into the other compressor(s).

(H)

The end of the intake shall be turned down and screened or otherwise be protected against the entry of vermin, debris, or precipitation by screening fabricated or composed of a noncorroding material.

5.1.3.6.3.12 Operating Alarms and Local Signals.

Medical air systems shall be monitored for conditions that can affect air quality during use or in the event of failure, based on the type of compressor(s) used in the system.

(A)

A local alarm complying with 5.1.9.5 shall be provided for the medical air compressor source.

(B)

Where liquid ring air compressors, compressors having water-cooled heads, or water-cooled aftercoolers are used, air receivers shall be equipped with a high water level sensor that shuts down the compressor system and activates a local alarm indicator. *[See 5.1.9.5.4 (7).]*

(C)

Where liquid ring compressors are used, each compressor shall have a liquid level sensor in each air–water separator that, when the liquid level is above the design level, shuts down its compressor and activates a local alarm indicator. *[See 5.1.9.5.4 (8).]*

(D)

Where nonliquid ring compressors compliant with 5.1.3.6.3.4(A) (1) are used, the air temperature at the immediate outlet of each compressor cylinder shall be monitored by a high-temperature sensor that shuts down that compressor and activates a local alarm indicator *[see 5.1.9.5.4 (9)]*. The temperature setting shall be as recommended by the compressor manufacturer.

(E)

Where compressors compliant with 5.1.3.6.3.4(A) (2) and (3) are used, the following requirements shall apply:

(1) The air temperature at the immediate outlet of each compressor chamber shall be monitored by a high-temperature sensor that shuts down that compressor and activates a local alarm indicator *(see 5.1.9.5.4)*, the temperature setting shall be as recommended by the compressor manufacturer.

(2) Coalescing filters with element change indicator shall be provided.

(3) Charcoal absorber shall be provided.

(4) Gaseous hydrocarbons shall be monitored on a quarterly basis.

(F)

When the backup or lag compressor is running, a local alarm shall activate *[see 5.1.9.5.4 (1)]*. This signal shall be manually reset.

5.1.3.6.3.13 Medical Air Quality Monitoring.

Medical air quality shall be monitored downstream of the medical air regulators and upstream of the piping system as follows:

(1) Dew point shall be monitored and shall activate a local alarm and all master alarms when the dew point at system delivery pressure exceeds ± 2°C (± 35°F).

(2) Carbon monoxide shall be monitored and shall activate a local alarm when the CO level exceeds 10 ppm. *[See 5.1.9.5.4 (2).]*

(3) Dew point and carbon monoxide monitors shall activate their individual monitor's signal at the alarm panels where their signals are required when their power is lost.

5.1.3.6.3.14 Category 1 Medical Air Proportioning System.

(A) General.

(1) Medical air reconstituted from oxygen USP and nitrogen NF, produced using proportioning system(s), shall be required to meet the following:

(2) The quality of medical air shall be in accordance with 5.1.3.6.1 .

(3) The system shall be capable of supplying this quality of medical air, per 5.1.3.6.1 , over the entire range of flow.

(4) The system shall produce medical air with an oxygen content of 19.5 percent to 23.5 percent.

(5) The medical air shall be cleared for marketing by the FDA or approved by the FDA.

(6) The medical air proportioning system shall operate automatically.

(7) The mixture shall be analyzed continuously, and a recording capability shall be provided (e.g., via data port).

(8) The analyzing system specified in 5.1.3.6.3.14(A) (3) shall be a dedicated and an independent analyzer used to control the medical air proportioning system.

(9) If the mixture goes out of specification, an alarm shall be activated automatically, the primary medical air proportioning system shall be disconnected, and the reserve supply shall be activated.

(10) The system shall be arranged such that manual intervention is necessary to correct the composition of the mixture before reconnecting the medical air proportioning system to the health care facility pipeline system.

(11) If dedicated sources of oxygen USP and nitrogen NF supply the medical air proportioning system, reserve sources for the oxygen and nitrogen shall not be required.

(12) If dedicated sources of oxygen USP and nitrogen NF supply the medical air proportioning system, they shall not be used as the reserves for oxygen and nitrogen systems supplying the pipelines of the health care facility.

(13)* If the sources of oxygen USP and nitrogen NF that supply the medical air proportioning system are the same sources that supply the health care facility, engineering controls shall be provided to prevent cross contamination of oxygen and nitrogen supply lines, as provided in 5.1.3.5.8 .

(14) A risk analysis and approval from the authority having jurisdiction shall be required.

(B)

Location. The medical air proportioning system shall be located per 5.1.3.3 as follows:

(1) The medical air proportioning system's supply of oxygen USP and nitrogen NF shall be located per 5.1.3.3 and NFPA 55, as applicable.

(2) The mixing device and controls, analyzers, and receivers shall be located indoors within a room or area per 5.1.3.3.1.

(3) The indoor location shall include atmospheric monitoring for oxygen concentration.

(4) The indoor location shall be constructed with all required utilities (e.g., electricity, drains, lighting) per *NFPA 5000*.

(5) The indoor location shall be ventilated and heated per Chapter 9 and the manufacturer's recommendations.

(C)

Required Components. The medical air proportioning system shall consist of the following:

(1) Supply of oxygen USP and supply of nitrogen NF as follows:

(2) _ The supply lines shall be filtered to remove particulate entering the proportioning system.

(3) _ The minimum safe supply gas temperature and recommended local signal shall be specified by the medical air proportioning system manufacturer.

(4) Mixing device with analyzers and engineering controls per manufacturer's recommendations to include, as a minimum, the following:

(5) _ At least two oxygen analyzers capable of independently monitoring oxygen concentration

(6) _ Mechanism where each analyzer based upon nonconforming oxygen concentration is capable, directly or via other medical air proportioning system controls, of automatically shutting off the supply from the medical air proportioning system to the medical air piped distribution system and activating the reserve supply

(7) _ Mechanism where each analyzer, based upon nonconforming oxygen concentration, is capable, directly or via other proportioning system controls, of automatically shutting off the supply of oxygen and nitrogen to the proportioning system and activating the reserve supply

(8) _ Provision for manual resetting of the proportioning system after detection of nonconforming oxygen concentration and subsequent shutdown once conforming oxygen concentration is established, in order to re-establish flow to the medical air piping system

(9) _ Means of verifying the performance of the analyzers by reference to an air standard, with known traceable oxygen content

(10) Minimum of one recorder for recording the medical air proportioning system performance and air quality for a period of not less than 24 hours

(11) Continuous analysis of the mixture and a recording capability provided (e.g., via a data port)

(12) Mechanism for isolating the primary medical air proportioning system from the reserve supply and the medical air piping distribution system by employing sequential valves for redundancy

(13) Capability of the reserve supply to automatically activate if the primary supply is isolated

(14) Reserve supply of medical air USP sized, at minimum, for an average day's supply and consisting of one of the following:

(15) _ Additional medical air proportioning unit with a dedicated supply of oxygen USP and nitrogen NF

(16) _ Medical air compressor system per 5.1.3.5.11 , with the exception of the allowance of a simplex medical air compressor system

(17) _ Medical air cylinder manifold per 5.1.3.5.11

(18) Receiver fitted with a pressure relief valve and pressure gauge as follows:

(19) _ The receiver shall be constructed of corrosion-resistant materials.

(20) _ The receiver, relief valves, and pressure gauges shall comply with ASME *Boiler and Pressure Vessel Code* and manufacturer's recommendations.

(21)* Warning systems per 5.1.9, including a local signal and master alarm that indicates nonconforming oxygen concentration per manufacturer's recommendations

(22) Final line pressure regulators complying with 5.1.3.5.5

(23) Pressure relief complying with 5.1.3.5.6

(24) Local signals complying with 5.1.3.5.9.2

Statement of Problem and Substantiation for Public Input

The term Central Supply systems is quite important in using Chapter 5, but it is never formally defined. The term central supply system is used as is the term "Supply Source" but the usage is not entirely consistent. The proposal attempts to improve this.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 112-NFPA 99-2015 [New Section after 3.3.22]	parent

Submitter Information Verification

Submitter Full Name: MARK ALLEN
Organization: BEACON MEDAES
Street Address:
City:
State:
Zip:
Submittal Date: Mon May 25 10:27:11 EDT 2015

Committee Statement

Resolution: FR-601-NFPA 99-2015
Statement: terminology

Public Input No. 427-NFPA 99-2015 [Section No. 5.1.3.6.3.7]

5.1.3.6.3.7 Medical Air Dryers.

Medical air dryers, where required, shall meet the following requirements:

(1) Be designed to provide air at a maximum dew point that is below the frost ~~point [0°C (32°F)] at~~ point at 345 kPa to 380 kPa (50 psi to 55 psi) at any level of demand

(2) Be sized for 100 percent of the system peak calculated demand at design conditions

(3) Be constructed of materials deemed suitable by the manufacturer

(4) Be provided with antivibration mountings installed as required by equipment dynamics or location and in accordance with the manufacturer's recommendations

Statement of Problem and Substantiation for Public Input

This is a place holder for the Task Group #1 discussion.

Submitter Information Verification

Submitter Full Name: JONATHAN WILLARD
Organization: ACUTE MEDICAL GAS SERVICES
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 12:59:01 EDT 2015

Committee Statement

Resolution: The committee is open to receiving more research and analysis of dew point requirements. The discussion in the meeting resolved that there is not a clinical concern at any of the possible levels since for clinical applications, the air is needed to be humidifies regardless. The analysis should review what dew point levels can result in water in a pipeline or water causing mechanical damage.

Public Input No. 334-NFPA 99-2015 [Section No. 5.1.3.6.3.9(A)]

(A)

Component arrangement shall be as follows:

(1) Components shall be arranged to allow service and a continuous supply of medical air in the event of a single fault failure.

(2) Component arrangement shall be permitted to vary as required by the technology(ies) employed, provided that an equal level of operating redundancy and medical air quality is maintained.

(3) Components shall be arranged to prevent a single fault failure that does not hinder preformance of other componets except as defined under 5.1.3.6.3.9(F)

Statement of Problem and Substantiation for Public Input

Separating the compressors from the filter, dryer, regulators will allow compressor redundancy to remain with the failure of a filter, dryer, or regulator.

Submitter Information Verification

Submitter Full Name: Anthony Lowe
Organization: Allied Hospital Systems
Street Address:
City:
State:
Zip:
Submittal Date: Fri Jul 03 12:35:15 EDT 2015

Committee Statement

Resolution: The proposed language is redundant to item (A) (1).

Public Input No. 151-NFPA 99-2015 [Section No. 5.1.3.6.3.10]

(A) Medical air source systems shall be controlled to ensure continuous supply of medical air at pressures consistent with Table 5.1.

~~3.6.3.10 Electrical Power and Control.~~

~~(A)~~ –

~~An additional~~
11 under all conditions of system use as follows:

(1) Automatic activation of compressor(s)

~~shall automatically activate when the compressor(s) in operation is incapable of maintaining the required pressure.~~

~~(B)~~ –

~~Automatic or manual alternation of compressors shall allow division of operating time. If automatic alternation of compressors is not provided~~
as necessary to supply the demand.

(2) Managing the operation to equalize wear on all compressors. Where this equalization is achieved manually, the facility staff shall arrange a schedule for manual alternation.

(

~~C) Each compressor motor shall be provided with electrical components including, but not limited to, the following:~~

- ~~Dedicated disconnect switch installed in the electrical circuit ahead of each motor starter~~
- ~~Motor starting device~~
- ~~Overload protection~~

~~Where compressor~~
B) Controls shall provide the following functions:

(1) Where medical air source systems having two or more compressors employ

~~a control transformer or other voltage control power device, installation of at least two such devices~~
any electrical circuit device which upon failure could prevent supply of medical air, the controls shall be provided with a automatically activated alternative method for ensuring supply (i.e. redundant component(s), an alternate electrical supply path or other equivalent method).

(2) Control circuits arranged in such a manner that

~~the shutdown~~
isolation of one compressor or component from the system (e.g. for maintenance or repair) does not interrupt the operation of

~~another compressor~~
other compressor(s) or component(s).

(3) Automatic restart function, such that the

~~compressor(s) will restart~~
supply of medical air will resume normally after power interruption without manual intervention

(C) Each compressor motor shall be provided with electrical components including, but not limited to, the following:

(1) Dedicated disconnect switch installed in the electrical circuit ahead of each motor starter

(2) Motor starting device

(3) Overload protection

(D)

Electrical installation and wiring shall conform to the requirements of *NFPA 70*, *National Electrical Code*.

(E)

Emergency electrical service for the compressors shall conform to the requirements of the essential electrical system as described in Chapter 6.

Statement of Problem and Substantiation for Public Input

The standard was written around one type of control (on/off operation defined by pressure). Control methods for compressors and pumps

are becoming more sophisticated and now can control on other conditions (e.g. flow) and in a variety of modes (e.g. continuous run with VSD). The proposed text attempts to account for these developments while preserving the performance characteristics inherent in the original text.

Submitter Information Verification

Submitter Full Name: MARK ALLEN
Organization: BEACON MEDAES
Street Address:
City:
State:
Zip:
Submittal Date: Mon May 25 13:26:49 EDT 2015

Committee Statement

Resolution: FR-620-NFPA 99-2015

Statement: The standard was written around one type of control (on/off operation defined by pressure). Control methods for compressors and pumps are becoming more sophisticated and now can control on other conditions (e.g. flow) and in a variety of modes (e.g. continuous run with VSD). The proposed text attempts to account for these developments while preserving the performance characteristics inherent in the original text.

Previously the language of Item (C) potentially allowed the installation of equipment that did not comply with NFPA70E. The language of (C) has been revised to prevent this.

Public Input No. 336-NFPA 99-2015 [Section No. 5.1.3.6.3.10(C)]

(C)
(C) Each compressor motor shall be provided with electrical components including, but not limited to, the following:

(1) Dedicated disconnect switch installed in the electrical circuit ahead of each motor starter

(2) Motor starting device

(3) Overload protection

~~(4) Where compressor systems having two or more compressors employ a control transformer or other voltage control power device, installation of at least two such devices~~ .

(D) Medical Air Compressor system controls shall be provided with electrical systems including at least:

(1) Built in disconnect means to allow appropriate operation of multiple compressor systems and protect service personnel from exposure to live voltages

(2) ~~(5) Control circuits arranged in such a manner that the shutdown of one compressor does not interrupt the operation of another compressor~~ Control circuits arranged so that failure of any component of the control circuit, or shutdown of one compressor (e.g. for service) does not interrupt automatic operation of the standby compressor

(3) ~~(6)~~ Automatic restart function, such that the compressor(s) will restart after power interruption without manual intervention

(4) Where components are common to more than one control circuit (e.g. autodrains) the common device shall be provided with electrical protection to prevent loss of the control circuits(s) in the event of short circuit in the device.

Statement of Problem and Substantiation for Public Input

Lack of language in NFPA 99 allows installation of equipment that does not comply with NFPA70E.
Current designs infield allow for blown fuse to shutdown complete medical air system.

Submitter Information Verification

Submitter Full Name: Anthony Lowe
Organization: Allied Hospital Systems
Street Address:
City:
State:
Zip:
Submittal Date: Fri Jul 03 13:19:56 EDT 2015

Committee Statement

Resolution: FR-620-NFPA 99-2015
Statement: The standard was written around one type of control (on/off operation defined by pressure). Control methods for compressors and pumps are becoming more sophisticated and now can control on other conditions (e.g. flow) and in a variety of modes (e.g. continuous run with VSD). The proposed text attempts to account for these developments while preserving the performance characteristics inherent in the original text.

Previously the language of Item (C) potentially allowed the installation of equipment that did not comply with NFPA70E. The language of (C) has been revised to prevent this.

Public Input No. 39-NFPA 99-2015 [Section No. 5.1.3.6.3.10(C)]

(C)

Each compressor motor shall be provided with electrical components including, but not limited to, the following:

(1) Dedicated disconnect switch installed in the electrical circuit ahead of each motor starter

(2) Motor starting device

(3) Overload protection

(4) Where compressor systems having two or more compressors employ a control transformer or other voltage control power device, installation of at least two such devices

(5) Control circuits arranged in such a manner that the shutdown of one compressor does not interrupt the operation of another compressor

(6) Automatic restart function, such that the compressor(s) will restart after power interruption without manual intervention

(7) Control circuits utilizing fuses for overcurrent protection shall be provided with means to replace the fuse without interruption to the control circuit.

Additional Proposed Changes

File Name	Description	Approved
PC_74_PIP.pdf	NFPA 99_PC74_	

Statement of Problem and Substantiation for Public Input

NOTE: The following Public Input appeared as “Reject but Hold” in Public Comment No. 74 of the (A2014) Second Draft Report for NFPA 99 and per the Regs. At 4.4.8.3.1.
Currently some medical air compressor manufacturers are utilizing fuses to protect the compressor PLC. The compressor PLC also control the air treatment equipment, dryers, co & dp monitors, condensate drains, etc. If the fuse blows the PLC no longer received power and the aforesaid equipment will not operate. NFPA 70 requires a control panels to have means to disconnect without flipping a main breaker -In the field there are numerous medical air compressor that comply with NFPA 99 but not NFPA 70. Electrical Inspectors do not find the problem due to the medical air compressor system have control panel mounted disconnects that appear at a glance to disconnect the complete panel but the panel is still HOT.

Submitter Information Verification

Submitter Full Name: TC ON HEA-PIP
Organization: NFPA
Street Address:
City:
State:
Zip:
Submittal Date: Thu Apr 09 12:23:45 EDT 2015

Committee Statement

Resolution: FR-620-NFPA 99-2015

Statement: The standard was written around one type of control (on/off operation defined by pressure). Control methods for compressors and pumps are becoming more sophisticated and now can control on other conditions (e.g. flow) and in a variety of modes (e.g. continuous run with VSD). The proposed text attempts to account for these developments while preserving the performance characteristics inherent in the original text.

Previously the language of Item (C) potentially allowed the installation of equipment that did not comply with NFPA70E. The language of (C) has been revised to prevent this.

Public Input No. 42-NFPA 99-2015 [Section No. 5.1.3.6.3.10(C)]

(C)

Each compressor motor shall be provided with electrical components including, but not limited to, the following:

(1) Dedicated disconnect switch installed in the electrical circuit ahead of each motor starter

(2) Motor starting device

(3) Overload protection

(4) Where compressor systems having two or more compressors employ a control transformer or other voltage control power device, installation of at least two such devices

(5) Control circuits arranged in such a manner that the shutdown of one compressor does not interrupt the operation of another compressor

(6) Automatic restart function, such that the compressor(s) will restart after power interruption without manual intervention

(7) Electrical devices not directing controlling the operation of the compressors shall be powered from a separate EESS power feed.

Additional Proposed Changes

File Name	Description	Approved
PC_78_PIP.pdf	NFPA 99_PC78	

Statement of Problem and Substantiation for Public Input

NOTE: The following Public Input appeared as “Reject but Hold” in Public Comment No. 78 of the (A2014) Second Draft Report for NFPA 99 and per the Regs. At 4.4.8.3.1.
We had a single feed coming in to a fuse block that fed the entire air treatment center. When a 2 amp control fuse blew, the entire air treatment center was shut down. This created a hazrard to the care of our patients and for the tech who came to serve the unit being that the panel was still live.

Submitter Information Verification

Submitter Full Name: TC ON HEA-PIP
Organization: NFPA
Street Address:
City:
State:
Zip:
Submittal Date: Thu Apr 09 12:48:20 EDT 2015

Committee Statement

Resolution: The substantiation does not provide adequate technical substantiation, other than a single incident, for adding this new requirement.

Public Input No. 152-NFPA 99-2015 [Section No. 5.1.3.6.3.12(F)]

(F)

~~When the backup or lag compressor is running~~ (F) When the capacity of the medical air system not in use is less than the equivalent capacity of one compressor , a local alarm shall activate [see 5.1.9.5.4 (1)] . This signal shall ~~be manually~~ require manual reset.

Statement of Problem and Substantiation for Public Input

The standard was written around one type of control (on/off operation defined by pressure). Control methods for compressors and pumps are becoming more sophisticated and now can control on other conditions (e.g. flow) and in a variety of modes (e.g. continuous run with VSD). The proposed text attempts to account for these developments while preserving the performance characteristics inherent in the original text.

Submitter Information Verification

Submitter Full Name: MARK ALLEN
Organization: BEACON MEDAES
Street Address:
City:
State:
Zip:
Submittal Date: Mon May 25 13:31:35 EDT 2015

Committee Statement

Resolution: FR-621-NFPA 99-2015
Statement: The standard was written around one type of control (on/off operation defined by pressure). Control methods for compressors and pumps are becoming more sophisticated and now can control on other conditions (e.g. flow) and in a variety of modes (e.g. continuous run with VSD). The proposed text attempts to account for these developments while preserving the performance characteristics inherent in the original text.

Public Input No. 395-NFPA 99-2015 [Section No. 5.1.3.6.3.13]

5.1.3.6.3.13 Medical Air Quality Monitoring.

Medical air quality shall be monitored downstream of the medical air regulators and upstream of the piping system as follows:

(1) Dew point shall be monitored and shall activate a local alarm and all master alarms when the dew point at system delivery pressure exceeds ± 2°C (± 35°F).

(2) Carbon monoxide shall be monitored and shall activate a local alarm when the CO level exceeds 10 ppm. *[See 5.1.9.5.4 (2).]* ~~Dew point and carbon monoxide monitors shall activate~~

(3) Carbon dioxide shall be monitored and shall activate a local alarm when the CO2 level exceeds 500 ppm.

(4) Oxygen concentration shall be moitored and shall activate a local alarm and all master alarms when the oxygen concentration falls below 19.5% or exceeds 23.5%.

(5) All medical air quality monitors shall activate their individual monitor's signal at the alarm panels where their signals are required when their power is lost.

Statement of Problem and Substantiation for Public Input

We should be monitoring the medical air system for all of the USP requirements. It states in the general section that medical air compressor systems must meet the requirements of USP. This criteria should be monitored continuously to ensure patient safety.

Submitter Information Verification

Submitter Full Name: JONATHAN WILLARD
Organization: ACUTE MEDICAL GAS SERVICES
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jul 05 13:09:52 EDT 2015

Committee Statement

Resolution: The statement of the submitter states that the intent of revising this section is to monitor medical air for USP quality. The proposed text only addresses certain aspects of medical air USP requirements. Further, patient safety is not significantly increased by the proposed monitoring, especially at the very low levels suggested.

Public Input No. 428-NFPA 99-2015 [Section No. 5.1.3.6.3.13]

5.1.3.6.3.13 Medical Air Quality Monitoring.

Medical air quality shall be monitored downstream of the medical air regulators and upstream of the piping system as follows:

(1) Dew point shall be monitored and shall activate a local alarm and all master alarms when the dew point at system delivery pressure exceeds ~~+2°C (+35°F)~~ .

(2) Carbon monoxide shall be monitored and shall activate a local alarm when the CO level exceeds 10 ppm. *[See 5.1.9.5.4 (2).]*

(3) Dew point and carbon monoxide monitors shall activate their individual monitor's signal at the alarm panels where their signals are required when their power is lost.

Statement of Problem and Substantiation for Public Input

This is a placeholder for the Task Group #1 discussion.

Submitter Information Verification

Submitter Full Name: JONATHAN WILLARD
Organization: ACUTE MEDICAL GAS SERVICES
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 13:01:03 EDT 2015

Committee Statement

Resolution: The committee is open to receiving more research and analysis of dew point requirements. The discussion in the meeting resolved that there is not a clinical concern at any of the possible levels since for clinical applications, the air is needed to be humidifies regardless. The analysis should review what dew point levels can result in water in a pipeline or water causing mechanical damage.

Public Input No. 124-NFPA 99-2015 [Section No. 5.1.3.6.3.14]

5.1.3.6.3.14 Category 1 Medical Air Proportioning ~~System~~ Supply Sources .

(A) General.

(1) Medical air reconstituted from oxygen USP and nitrogen NF, produced using proportioning system(s), shall be required to meet the following:

(2) The quality of medical air shall be in accordance with 5.1.3.6.1 .

(3) The system shall be capable of supplying this quality of medical air, per 5.1.3.6.1 , over the entire range of flow.

(4) The system shall produce medical air with an oxygen content of 19.5 percent to 23.5 percent.

(5) The medical air shall be cleared for marketing by the FDA or approved by the FDA.

(6) The medical air proportioning system shall operate automatically.

(7) The mixture shall be analyzed continuously, and a recording capability shall be provided (e.g., via data port).

(8) The analyzing system specified in 5.1.3.6.3.14(A) (3) shall be a dedicated and an independent analyzer used to control the medical air proportioning system.

(9) If the mixture goes out of specification, an alarm shall be activated automatically, the primary medical air proportioning system shall be disconnected, and the reserve supply shall be activated.

(10) The system shall be arranged such that manual intervention is necessary to correct the composition of the mixture before reconnecting the medical air proportioning system to the health care facility pipeline system.

(11) If dedicated sources of oxygen USP and nitrogen NF supply the medical air proportioning system, reserve sources for the oxygen and nitrogen shall not be required.

(12) If dedicated sources of oxygen USP and nitrogen NF supply the medical air proportioning system, they shall not be used as the reserves for oxygen and nitrogen systems supplying the pipelines of the health care facility.

(13)* If the sources of oxygen USP and nitrogen NF that supply the medical air proportioning system are the same sources that supply the health care facility, engineering controls shall be provided to prevent cross contamination of oxygen and nitrogen supply lines, as provided in 5.1.3.5.8.

(14) A risk analysis and approval from the authority having jurisdiction shall be required.

(B)

Location. The medical air proportioning system shall be located per 5.1.3.3 as follows:

(1) The medical air proportioning system's supply of oxygen USP and nitrogen NF shall be located per 5.1.3.3 and NFPA 55, as applicable.

(2) The mixing device and controls, analyzers, and receivers shall be located indoors within a room or area per 5.1.3.3.1.

(3) The indoor location shall include atmospheric monitoring for oxygen concentration.

(4) The indoor location shall be constructed with all required utilities (e.g., electricity, drains, lighting) per *NFPA 5000*.

(5) The indoor location shall be ventilated and heated per Chapter 9 and the manufacturer's recommendations.

(C)

Required Components. The medical air proportioning system shall consist of the following:

(1) Supply of oxygen USP and supply of nitrogen NF as follows:

(2) _ The supply lines shall be filtered to remove particulate entering the proportioning system.

(3) _ The minimum safe supply gas temperature and recommended local signal shall be specified by the medical air proportioning system manufacturer.

(4) Mixing device with analyzers and engineering controls per manufacturer's recommendations to include, as a minimum, the following:

(5) _ At least two oxygen analyzers capable of independently monitoring oxygen concentration

(6) _ Mechanism where each analyzer based upon nonconforming oxygen concentration is capable, directly or via other medical air proportioning system controls, of automatically shutting off the supply from the medical air proportioning system to the medical air piped distribution system and activating the reserve supply

(7) _ Mechanism where each analyzer, based upon nonconforming oxygen concentration, is capable, directly or via other proportioning system controls, of automatically shutting off the supply of oxygen and nitrogen to the proportioning system and activating the reserve supply

(8) _ Provision for manual resetting of the proportioning system after detection of nonconforming oxygen concentration and subsequent shutdown once conforming oxygen concentration is established, in order to re-establish flow to the medical air piping system

(9) _ Means of verifying the performance of the analyzers by reference to an air standard, with known traceable oxygen content

(10) Minimum of one recorder for recording the medical air proportioning system performance and air quality for a period of not less than 24 hours

(11) Continuous analysis of the mixture and a recording capability provided (e.g., via a data port)

(12) Mechanism for isolating the primary medical air proportioning system from the reserve supply and the medical air piping distribution system by employing sequential valves for redundancy

(13) Capability of the reserve supply to automatically activate if the primary supply is isolated

(14) Reserve supply of medical air USP sized, at minimum, for an average day's supply and consisting of one of the following:

(15) _ Additional medical air proportioning unit with a dedicated supply of oxygen USP and nitrogen NF

(16) _ Medical air compressor system per 5.1.3.5.11 , with the exception of the allowance of a simplex medical air compressor system

(17) _ Medical air cylinder manifold per 5.1.3.5.11

(18) Receiver fitted with a pressure relief valve and pressure gauge as follows:

(19) _ The receiver shall be constructed of corrosion-resistant materials.

(20) _ The receiver, relief valves, and pressure gauges shall comply with ASME *Boiler and Pressure Vessel Code* and manufacturer's recommendations.

(21)* Warning systems per 5.1.9, including a local signal and master alarm that indicates nonconforming oxygen concentration per manufacturer's recommendations

(22) Final line pressure regulators complying with 5.1.3.5.5

(23) Pressure relief complying with 5.1.3.5.6

(24) Local signals complying with 5.1.3.5.9.2

Statement of Problem and Substantiation for Public Input

The term Central Supply systems is quite important in using Chapter 5, but it is never formally defined. The term central supply system is used as is the term "Supply Source" but the usage is not entirely consistent. The proposal attempts to improve this.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 112-NFPA 99-2015 [New Section after 3.3.22]	parent

Submitter Information Verification

Submitter Full Name: MARK ALLEN
Organization: BEACON MEDAES
Street Address:
City:
State:
Zip:
Submittal Date: Mon May 25 10:30:09 EDT 2015

Committee Statement

Resolution: FR-601-NFPA 99-2015
Statement: terminology

Public Input No. 125-NFPA 99-2015 [Section No. 5.1.3.7]

5.1.3.7* Medical–Surgical Vacuum Central Supply Systems.

5.1.3.7.1 ~~– Medical–Surgical Vacuum Sources.~~

~~5.1.3.7.1.1 –~~

Medical–surgical vacuum ~~sources~~ Central Supply Systems shall be located per 5.1.3.3 as follows:

(1) Indoors in a dedicated mechanical equipment area, adequately ventilated and with any required utilities

(2) In a room ventilated per 5.1.3.3.3.3

(3) For air-cooled equipment, in a room designed to maintain the ambient temperature range as recommended by the equipment manufacturer

5.1.3.7.~~1.~~ 2

Medical–surgical vacuum ~~sources~~ Central Supply Systems shall consist of the following:

(1) Two or more vacuum pumps sufficient to serve the peak calculated demand with the largest single vacuum pump out of service

(2) Automatic means to prevent backflow from any on-cycle vacuum pumps through any off-cycle vacuum pumps

(3) Shutoff valve or other isolation means to isolate each vacuum pump from the centrally piped system and other vacuum pumps for maintenance or repair without loss of vacuum in the system

(4) Vacuum receiver

(5) Piping between the vacuum pump(s), discharge(s), receiver(s), and vacuum source shutoff valve in accordance with 5.1.10.2, except brass, galvanized, or black steel pipe, which is permitted to be used as recommended by the manufacturer

(6) Except as defined in 5.1.3.7.1.2 (1) through (5), materials and devices used between the medical vacuum exhaust and the medical vacuum source that are permitted to be of any design or construction appropriate for the service as determined by the manufacturer

5.1.3.7.2 – 3 _ Vacuum Pumps.

5.1.3.7.~~2~~ 3 .1

Vacuum pumps shall be constructed of materials deemed suitable by the manufacturer.

5.1.3.7.~~2~~ 3 .2

Antivibration mountings shall be installed for vacuum pumps as required by equipment dynamics or location and in accordance with the manufacturer's recommendations.

5.1.3.7.~~2~~ 3 .3

Flexible connectors shall connect the vacuum pumps with their intake and outlet piping.

5.1.3.7.~~2~~ 3 .4

For liquid ring vacuum pumps, seal water shall be of a quality recommended by the vacuum pump manufacturer.

5.1.3.7.3 – 4 _ Vacuum Receivers.

Receivers for vacuum shall meet the following requirements:

(1) They shall be made of materials deemed suitable by the manufacturer.

(2) They shall comply with Section VIII, “Unfired Pressure Vessels,” of the ASME *Boiler and Pressure Vessel Code.*

(3) They shall be capable of withstanding a gauge pressure of 415 kPa (60 psi) and 760 mm (30 in.) gauge HgV.

(4) They shall be equipped with a manual drain.

(5) They shall be of a capacity based on the technology of the pumps.

5.1.3.7.4 – 5 _ Piping Arrangement and Redundancies.

5.1.3.7.4 5 .1

Piping arrangement shall be as follows:

(1) Piping shall be arranged to allow service and a continuous supply of medical–surgical vacuum in the event of a single fault failure.

(2) Piping arrangement shall be permitted to vary based on the technology(ies) employed, provided that an equal level of operating redundancy is maintained.

(3) Where only one set of vacuum pumps is available for a combined medical–surgical vacuum system and an analysis, a research, or a teaching laboratory vacuum system, such laboratories shall be connected separately from the medical–surgical system directly to the receiver tank through its own isolation valve and fluid trap located at the receiver, and between the isolation valve and fluid trap, a scrubber shall be permitted to be installed.

5.1.3.7.4 5 .2

The medical–surgical vacuum receiver(s) shall be serviceable without shutting down the medical–surgical vacuum system by any method to ensure continuation of service to the facility's medical–surgical pipeline distribution system.

5.1.3.7.4 5 .3

Medical–surgical vacuum ~~source~~ central supply systems shall be provided with a source shutoff valve per 5.1.4.2.

5.1.3.7.5 – 6 _ Electrical Power and Control.

5.1.3.7.5 6 .1

Additional pumps shall automatically activate when the pump(s) in operation is incapable of adequately maintaining the required vacuum.

5.1.3.7.5 6 .2

Automatic or manual alternation of pumps shall allow division of operating time. If automatic alternation of pumps is not provided, the facility staff shall arrange a schedule for manual alternation.

5.1.3.7.5 6 .3

Each pump motor shall be provided with electrical components including, but not limited to, the following:

(1) Dedicated disconnect switch installed in the electrical circuit ahead of each motor starter

(2) Motor starting device

(3) Overload protection

(4) Where pump systems having two or more pumps employ a control transformer or other voltage control power device, at least two such devices

(5) Control circuits arranged in such a manner that the shutdown of one pump does not interrupt the operation of another pump

(6) Automatic restart function such that the pump(s) will restart after power interruption without manual intervention

5.1.3.7.5 6 .4

Electrical installation and wiring shall conform to the requirements of *NFPA 70*, *National Electrical Code*.

5.1.3.7.5 6 .5

Emergency electrical service for the pumps shall conform to the requirements of the essential electrical system as described in Chapter 6.

5.1.3.7.6 – 7 _ Medical–Surgical Vacuum ~~Source~~ Exhaust.

5.1.3.7.6 7 .1

The medical–surgical vacuum pumps shall exhaust in a manner and location that minimizes the hazards of noise and contamination to the facility and its environment.

5.1.3.7.6 7 .2

The exhaust shall be located as follows:

(1) Outdoors

(2) At least 7.5 m (25 ft) from any door, window, air intake, or other openings in buildings or places of public assembly

(3) At a level different from air intakes

(4) Where prevailing winds, adjacent buildings, topography, or other influences will not divert the exhaust into occupied areas or prevent dispersion of the exhaust

5.1.3.7.6 7 .3

The end of the exhaust shall be turned down and screened or otherwise be protected against the entry of vermin, debris, or precipitation by screening fabricated or composed of a noncorroding material.

5.1.3.7.6 7 .4

The exhaust shall be free of dips and loops that might trap condensate or oil or provided with a drip leg and valved drain at the bottom of the low point.

5.1.3.7.6 7 .5

Vacuum exhausts from multiple pumps shall be permitted to be joined together to one common exhaust where the following conditions are met:

(1) The common exhaust is sized to minimize back pressure in accordance with the pump manufacturer's recommendations.

(2) Each pump can be isolated by manual or check valve, blind flange, or tube cap to prevent open exhaust piping when the pump(s) is removed for service from consequent flow of exhaust air into the room.

5.1.3.7.6 7 .6

Vacuum exhaust piping shall be permitted to be made of materials and use a joining technique as permitted under 5.1.10.2 and 5.1.10.3.

5.1.3.7.7 – 8 _ Operating Alarms.

Medical–surgical vacuum **supply systems** shall activate a local alarm when the backup or lag pump is running per 5.1.9.5. This signal shall be manually reset.

Statement of Problem and Substantiation for Public Input

The term Central Supply systems is quite important in using Chapter 5, but it is never formally defined. The term central supply system is used as is the term "Supply Source" but the usage is not entirely consistent. The proposal attempts to improve this.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 112-NFPA 99-2015 [New Section after 3.3.22]	Parent

Submitter Information Verification

Submitter Full Name: MARK ALLEN
Organization: BEACON MEDAES
Street Address:
City:
State:
Zip:
Submittal Date: Mon May 25 10:31:50 EDT 2015

Committee Statement

Resolution: FR-601-NFPA 99-2015
Statement: terminology

Public Input No. 162-NFPA 99-2015 [Section No. 5.1.3.7.1.2]

5.1.3.7.1.2

Medical–surgical vacuum sources shall consist of the following:

(1) Two or more vacuum pumps sufficient to serve the peak calculated demand with the largest single vacuum pump out of service

(2) Automatic means to prevent backflow from any on-cycle vacuum pumps through any off-cycle vacuum pumps

(3) Shutoff valve or other isolation means to isolate each vacuum pump from the centrally piped system and other vacuum pumps for maintenance or repair without loss of vacuum in the system

(4) Vacuum receiver

(5) Piping between the vacuum pump(s), discharge(s), receiver(s), and vacuum source shutoff valve in accordance with 5.1.10.2, except brass, galvanized, or black steel pipe, which is permitted to be used as recommended by the manufacturer

(6) Except as defined in 5.1.3.7.1.2 (1) through (5), materials and devices used between the medical vacuum exhaust and the medical vacuum source that are permitted to be of any design or construction appropriate for the service as determined by the manufacturer

(7) Vacuum filtration per 5.1.3.7.5.

Statement of Problem and Substantiation for Public Input

See filtration proposal

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 161-NFPA 99-2015 [New Section after 5.1.3.7.3]	Parent

Submitter Information Verification

Submitter Full Name: MARK ALLEN
Organization: BEACON MEDAES
Street Address:
City:
State:
Zip:
Submittal Date: Mon May 25 14:43:01 EDT 2015

Committee Statement

Resolution: FR-652-NFPA 99-2015
Statement: See filtration proposal

Public Input No. 161-NFPA 99-2015 [New Section after 5.1.3.7.3]

5.1.3.7.4 Vacuum Filtration.

?(A) Central supply systems for vacuum shall be provided with duplex inlet filtration with the following characteristics:

(1) located on the source side of the vacuum central supply system and patient side of all other components,

(2) filters shall be efficient to 0.03µ and 99.97% (HEPA or better, per DOE-STD-3020-2005),

(3) sized for 100 percent of the peak calculated demand while one filter or filter bundle is isolated. It shall be permitted to group multiple filters into bundles to achieve the required capacities,

(4) they shall be provided with isolation or check valves on the source side of each filter and isolation valves on the patient side of each filter, permitting the filter to be isolated without shutting off flow to the central supply system,

(5) a sight glass shall be provided at the base of each filter to allow the user to observe any accumulations of liquids,

(6) a vacuum relief petcock to allow vacuum to be relieved in the filter canister during filter replacement,

(7) filter elements and canisters shall be permitted to be constructed of materials as deemed suitable by the manufacturer,

(8) in normal operation, one filter or filter bundle shall be isolated from the system should a blockage in the operating filter occur.

Statement of Problem and Substantiation for Public Input

Recent events have increased occupational health and safety and public health concerns over the biohazard emissions possible from a medical facility. One of these is the medical vacuum central supply system, which under NFPA discharges to atmosphere with no mandatory filtration. Such filters as are provided are coarse filters intended to protect the pumps, not the public or the worker.
NFPA is the only world standard which does not mandate inlet filtration on vacuum. Adding this requirement will bring NFPA into alignment with normal practice internationally, and afford a degree of assurance to the maintenance staff in medical facilities that the pumps are not contaminated.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 162-NFPA 99-2015 [Section No. 5.1.3.7.1.2]	

Submitter Information Verification

Submitter Full Name: MARK ALLEN
Organization: BEACON MEDAES
Street Address:
City:
State:
Zip:
Submittal Date: Mon May 25 14:40:48 EDT 2015

Committee Statement

Resolution: FR-651-NFPA 99-2015

Statement: Recent events have increased occupational health and safety and public health concerns over the biohazard emissions possible from a medical facility. One of these is the medical vacuum central supply system, which under NFPA discharges to atmosphere with no mandatory filtration. Such filters as are provided are coarse filters intended to protect the pumps, not the public or the worker.

NFPA is the only world standard which does not mandate inlet filtration on vacuum. Adding this requirement will bring NFPA into alignment with normal practice internationally, and afford a degree of assurance to the maintenance staff in medical facilities that the pumps are not contaminated.

Public Input No. 153-NFPA 99-2015 [Section No. 5.1.3.7.5]

5.1.3.7.5 Electrical Power and Control.

(A) Medical vacuum source systems shall be controlled to ensure continuous supply of suction at pressures consistent with Table 5.1.

~~3.7.5.1~~

~~Additional pumps shall automatically activate when the pump(s) in operation is incapable of adequately maintaining the required vacuum.~~

~~5.1.3.7.5.2~~

~~Automatic or manual alternation of pumps shall allow division of operating time. If automatic alternation of pumps is not provided~~ 11 under all conditions of system use as follows:

(1) Automatic activation of pump(s) as necessary to supply the demand.

(2) Managing the operation to equalize wear on all pumps. Where this equalization is achieved manually, the facility staff shall arrange a schedule for manual alternation.

~~5.1.3.7.5.3~~

~~Each pump motor shall be provided with electrical components including, but not limited to, the following:~~

- ~~Dedicated disconnect switch installed in the electrical circuit ahead of each motor starter~~
- ~~Motor starting device~~
- ~~Overload protection~~

~~Where pump~~

(B) Controls shall provide the following functions:

(1) Where medical vacuum source systems having two or more pumps employ

~~a control transformer or other voltage control power device, at least two such devices~~

any electrical circuit device which upon failure could prevent supply of medical vacuum, the controls shall be provided with a automatically activated alternative method for ensuring supply (i.e. redundant component(s), an alternate electrical supply path or other equivalent method).

(2) Control circuits arranged in such a manner that

~~the shutdown~~

isolation of one pump or component from the system (e.g. for maintenance or repair) does not interrupt the operation of

~~another pump~~

other pump(s) or component(s).

(3) Automatic restart function, such that the

~~pump(s) will restart~~

supply of medical vacuum will resume normally after power interruption without manual intervention

(C) Each pump motor shall be provided with electrical components including, but not limited to, the following:

(1) Dedicated disconnect switch installed in the electrical circuit ahead of each motor starter

(2) Motor starting device

(3) Overload protection

5.1.3.7.5.4

Electrical installation and wiring shall conform to the requirements of *NFPA 70*, *National Electrical Code*.

5.1.3.7.5.5

Emergency electrical service for the pumps shall conform to the requirements of the essential electrical system as described in Chapter 6.

Statement of Problem and Substantiation for Public Input

The standard was written around one type of control (on/off operation defined by pressure). Control methods for compressors and pumps are becoming more sophisticated and now can control on other conditions (e.g. flow) and in a variety of modes (e.g. continuous run with VSD). The proposed text attempts to account for these developments while preserving the performance characteristics inherent in the

original text.

Submitter Information Verification

Submitter Full Name: MARK ALLEN
Organization: BEACON MEDAES
Street Address:
City:
State:
Zip:
Submittal Date: Mon May 25 13:33:38 EDT 2015

Committee Statement

Resolution: FR-622-NFPA 99-2015

Statement: The standard was written around one type of control (on/off operation defined by pressure). Control methods for compressors and pumps are becoming more sophisticated and now can control on other conditions (e.g. flow) and in a variety of modes (e.g. continuous run with VSD). The proposed text attempts to account for these developments while preserving the performance characteristics inherent in the original text.

Previously the language of Item (C) potentially allowed the installation of equipment that did not comply with NFPA70E. The language of (C) and the new (D) has been revised to prevent this.

Public Input No. 337-NFPA 99-2015 [Section No. 5.1.3.7.5.3]

5.1.3.7.5.3

(1) Each pump motor shall be provided with electrical components including, but not limited to, the following:

(a) Dedicated disconnect switch installed in the electrical circuit ahead of each motor starter

(b) Motor starting device

(c) Overload protection

(d) ~~Where pump systems having two or more pumps employ a control transformer or other voltage control power device, at least two such devices~~ .

(2) Vacuum source system controls shall be provided with electrical systems including at least:

(a) ~~Control circuits arranged in such a manner that the shutdown of one pump does not interrupt the operation of another pump~~ . Control circuits arranged so that failure of any component of the control circuit, or shutdown of one pump (e.g. for service) does not interrupt automatic operation of the standby pump

(b) Controls shall be provided with built in disconnect means to allow appropriate operation of multiple pump systems and protect service personnel from exposure to live voltages.

(c) Where components are common to more than one control circuit, the common device shall be provided with electrical protection to prevent loss of the control circuits(s) in the event of short circuit in the device.

(d) Automatic restart function , such that the pump(s) will restart after power interruption without manual intervention

Statement of Problem and Substantiation for Public Input

Lack of language in NFPA 99 allows installation of equipment that does not comply with NFPA70E.
Current designs infield allow for blown fuse to shutdown complete vacuum system.

Submitter Information Verification

Submitter Full Name: Anthony Lowe
Organization: Allied Hospital Systems
Street Address:
City:
State:
Zip:
Submittal Date: Fri Jul 03 13:23:36 EDT 2015

Committee Statement

Resolution: FR-622-NFPA 99-2015

Statement: The standard was written around one type of control (on/off operation defined by pressure). Control methods for compressors and pumps are becoming more sophisticated and now can control on other conditions (e.g. flow) and in a variety of modes (e.g. continuous run with VSD). The proposed text attempts to account for these developments while preserving the performance characteristics inherent in the original text.

Previously the language of Item (C) potentially allowed the installation of equipment that did not comply with NFPA70E. The language of (C) and the new (D) has been revised to prevent this.

Public Input No. 154-NFPA 99-2015 [Section No. 5.1.3.7.7]

5.1.3.7.7 Operating Alarms.

~~Medical–surgical vacuum systems shall activate a local alarm when the backup or lag pump is running per~~ When the capacity of the medical vacuum system not in use is less than the equivalent capacity of one pump, a local alarm shall activate [see 5.1.9.5 .4(1)]. This signal shall ~~be manually~~ require manual reset.

Statement of Problem and Substantiation for Public Input

Substantiation:
The standard was written around one type of control (on/off operation defined by pressure). Control methods for compressors and pumps are becoming more sophisticated and now can control on other conditions (e.g. flow) and in a variety of modes (e.g. continuous run with VSD). The proposed text attempts to account for these developments while preserving the performance characteristics inherent in the original text.

Submitter Information Verification

Submitter Full Name: MARK ALLEN
Organization: BEACON MEDAES
Street Address:
City:
State:
Zip:
Submittal Date: Mon May 25 13:35:57 EDT 2015

Committee Statement

Resolution: FR-623-NFPA 99-2015
Statement: The standard was written around one type of control (on/off operation defined by pressure). Control methods for compressors and pumps are becoming more sophisticated and now can control on other conditions (e.g. flow) and in a variety of modes (e.g. continuous run with VSD). The revised text attempts to account for these developments while preserving the performance characteristics inherent in the original text.

Public Input No. 126-NFPA 99-2015 [Section No. 5.1.3.8]

5.1.3.8* Waste Anesthetic Gas Disposal (WAGD) Central Supply Systems .

5.1.3.8.1* – Supply Sources.

WAGD supply sources shall be chosen in consultation with the medical staff having knowledge of the requirements to determine the type of system, number and placement of terminals, and other required safety and operating devices.

5.1.3.8.1.1

WAGD shall be permitted to be produced through the medical–surgical vacuum source, by a dedicated producer, or by venturi.

5.1.3.8.1.2

If WAGD is produced by the medical–surgical vacuum source, the following shall apply:

(1) The medical–surgical vacuum source shall comply with 5.1.3.7.

(2) The total concentration of oxidizers (oxygen and nitrous oxide) shall be maintained below 23.6 percent, or the vacuum pump shall comply with 5.1.3.8.2.1.

(3) The medical–surgical vacuum source shall be sized to accommodate the additional volume.

5.1.3.8.1.3

If WAGD is produced by a dedicated WAGD producer with a total power equal to or greater than 1 horsepower in total (both producers), the following shall apply:

(1) The WAGD source shall be located in accordance with 5.1.3.3.

(2) The WAGD source shall be located indoors in a dedicated mechanical equipment area with any required utilities.

(3) The WAGD source shall be ventilated per 5.1.3.3.3.3.

(4) For air-cooled equipment, the WAGD source shall be located to maintain the ambient temperature range as recommended by the manufacturer.

(5) The WAGD producers shall comply with 5.1.3.8.2.

5.1.3.8.1.4

If WAGD is produced by a dedicated WAGD producer with a total power less than 1 horsepower in total (both producers), the following shall apply:

(1) The WAGD source shall be permitted to be located near the inlet(s) served.

(2) For air-cooled equipment, the WAGD source shall be located to maintain the ambient temperature range as recommended by the manufacturer.

5.1.3.8.1.5

For liquid ring pumps in WAGD service, seal water shall be of a quality as recommended by the pump manufacturer.

5.1.3.8.1.6

The WAGD source shall consist of the following:

(1) Two or more WAGD producers sufficient to serve the peak calculated demand with the largest single WAGD producer out of service

(2) Automatic means to prevent backflow from any on-cycle WAGD producers through any off-cycle WAGD producers

(3) Shutoff valve to isolate each WAGD producer from the centrally piped system and other WAGD producers for maintenance or repair without loss of WAGD in the system

(4) Piping between the WAGD producers and the source shutoff valve compliant with 5.1.10.2, as recommended by the manufacturer

(5) Antivibration mountings installed for WAGD producers as required by equipment dynamics or location and in accordance with the manufacturer's recommendations

(6) Flexible connectors interconnecting the producers with their intake and outlet piping as required by equipment dynamics or location and in accordance with the WAGD producer manufacturer's recommendations

5.1.3.8.1.7

If WAGD is produced by a venturi, the following shall apply:

(1) The venturi shall not be user-adjustable (i.e., require the use of special tools).

(2) The venturi shall be driven using water, inert gas, instrument air, or other dedicated air source.

(3) Medical air shall not be used to power the venturi.

5.1.3.8.2 WAGD Producers.

5.1.3.8.2.1

Vacuum pumps dedicated for WAGD service shall be as follows:

(1) Compliant with 5.1.3.7.2

(2) Designed of materials and using lubricants and sealants that are inert in the presence of oxygen, nitrous oxide, and halogenated anesthetics

5.1.3.8.2.2

Vacuum producers (e.g., fans or blowers) designed for operation at vacuums below 130 mm (5 in.) HgV shall be as follows:

(1) Permitted to be made of any materials determined by the manufacturer as suitable for the service

(2) Provided with antivibration mountings as required by equipment dynamics or location and in accordance with the manufacturer's recommendation

(3) Connected with their intake and outlet piping through flexible connections

(4) Used only for WAGD service and not employed for other services

(5) Interconnected via piping, ductwork, and so forth, made of materials determined by the manufacturer as suitable to the service

5.1.3.8.3 WAGD Alarms.

5.1.3.8.3.1

When the WAGD system is served by a central source(s), a local alarm complying with 5.1.9.5 shall be provided for the WAGD source.

5.1.3.8.3.2

A WAGD source system shall activate a local alarm when the backup or lag producer is running.

5.1.3.8.4 Electrical Power and Control.

5.1.3.8.4.1

Additional producers shall automatically activate when the producer(s) in operation is incapable of maintaining the required vacuum.

5.1.3.8.4.2

Automatic or manual alternation of producers shall allow division of operating time. If automatic alternation of producers is not provided, the facility staff shall arrange a schedule for manual alternation.

5.1.3.8.4.3

Each producer motor shall be provided with electrical components including, but not limited to, the following:

(1) Dedicated disconnect switch installed in the electrical circuit ahead of each motor starter

(2) Motor starting device

(3) Overload protection

(4) Where WAGD systems having two or more producers employ a control transformer or other voltage control power device, at least two such devices

(5) Control circuits arranged in such a manner that the shutdown of one producer does not interrupt the operation of another producer

(6) Automatic restart function such that the pump(s) will restart after power interruption without manual intervention

5.1.3.8.4.4

Electrical installation and wiring shall conform to the requirements of *NFPA 70*, *National Electrical Code*.

5.1.3.8.4.5

Emergency electrical service for the producers shall conform to the requirements of the essential electrical system as described in Chapter 6.

5.1.3.8.5 WAGD Exhaust.

The WAGD pumps shall exhaust in compliance with 5.1.3.7.6.

Statement of Problem and Substantiation for Public Input

The term Central Supply systems is quite important in using Chapter 5, but it is never formally defined. The term central supply system is used as is the term "Supply Source" but the usage is not entirely consistent. The proposal attempts to improve this.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 112-NFPA 99-2015 [New Section after 3.3.22]	Parent

Submitter Information Verification

Submitter Full Name: MARK ALLEN
Organization: BEACON MEDAES
Street Address:
City:
State:
Zip:
Submittal Date: Mon May 25 10:40:53 EDT 2015

Committee Statement

Resolution: FR-601-NFPA 99-2015
Statement: terminology

Public Input No. 156-NFPA 99-2015 [Section No. 5.1.3.8.3.2]

5.1.3.8.3.2 –

Operating Alarms

~~A~~

Where WAGD source

~~system shall activate a local alarm when the backup or lag producer is running.~~

systems have two or more producers, and the capacity of the WAGD system not in use is less than the equivalent capacity of one producer, a local alarm shall activate [see 5.1.9.5.4(1)]. This signal shall require manual reset.

Statement of Problem and Substantiation for Public Input

The standard was written around one type of control (on/off operation defined by pressure). Control methods for compressors and pumps are becoming more sophisticated and now can control on other conditions (e.g. flow) and in a variety of modes (e.g. continuous run with VSD). The proposed text attempts to account for these developments while preserving the performance characteristics inherent in the original text.

Submitter Information Verification

Submitter Full Name: MARK ALLEN
Organization: BEACON MEDAES
Street Address:
City:
State:
Zip:
Submittal Date: Mon May 25 13:38:45 EDT 2015

Committee Statement

Resolution: FR-624-NFPA 99-2015
Statement: The standard was written around one type of control (on/off operation defined by pressure). Control methods for compressors and pumps are becoming more sophisticated and now can control on other conditions (e.g. flow) and in a variety of modes (e.g. continuous run with VSD). The proposed text attempts to account for these developments while preserving the performance characteristics inherent in the original text.

Public Input No. 155-NFPA 99-2015 [Section No. 5.1.3.8.4.3]

5.1.3.8.4.3

~~Each producer motor shall be provided with electrical components including, but not limited to, the following:~~

- ~~Dedicated disconnect switch installed in the electrical circuit ahead of each motor starter~~
- ~~Motor starting device~~
- ~~Overload protection~~

~~Where WAGD~~ (A) WAGD source systems shall be controlled to ensure continuous flow under all conditions of system use as follows:

(1) Automatic activation of producer(s) as necessary to supply the demand.

(2) Managing the operation to equalize wear on all producers. Where this equalization is achieved manually, the facility staff shall arrange a schedule for manual alternation.

(B) Controls shall provide the following functions:

(1) Where WAGD source systems having two or more producers employ ~~a control transformer or other voltage control power device, at least two such devices~~ any electrical circuit device which upon failure could stop the WAGD, the controls shall be provided with a automatically activated alternative method for ensuring supply (i.e. redundant component(s), an alternate electrical supply path or other equivalent method).

(2) Control circuits arranged in such a manner that ~~the shutdown~~ isolation of one producer or component from the system (e.g. for maintenance or repair) does not interrupt the operation of ~~another producer~~ other pump(s) or component(s).

(3) Automatic restart function , such that the ~~pump(s) will restart~~ supply of WAGD will resume normally after power interruption without manual intervention

(C) Each producer motor shall be provided with electrical components including, but not limited to, the following:

(1) Dedicated disconnect switch installed in the electrical circuit ahead of each motor starter

(2) Motor starting device

(3) Overload protection

Statement of Problem and Substantiation for Public Input

The standard was written around one type of control (on/off operation defined by pressure). Control methods for compressors and pumps are becoming more sophisticated and now can control on other conditions (e.g. flow) and in a variety of modes (e.g. continuous run with VSD). The proposed text attempts to account for these developments while preserving the performance characteristics inherent in the original text.

Submitter Information Verification

Submitter Full Name: MARK ALLEN
Organization: BEACON MEDAES
Street Address:
City:
State:
Zip:
Submittal Date: Mon May 25 13:37:11 EDT 2015

Committee Statement

Resolution: FR-625-NFPA 99-2015
Statement: The standard was written around one type of control (on/off operation defined by pressure). Control methods for compressors and pumps are becoming more sophisticated and now can control on other conditions (e.g. flow) and in a variety of modes (e.g. continuous run with VSD). The proposed text attempts to account for these developments while preserving the performance characteristics inherent in the original text.

Previously the language of Item (C) potentially allowed the installation of equipment that did not comply with NFPA70E. The language of (C) and the new (D) has been revised to prevent this.

Public Input No. 338-NFPA 99-2015 [Section No. 5.1.3.8.4.3]

5.1.3.8.4.3

(1) Each producer motor shall be provided with electrical components including, but not limited to, the following:

(a) Dedicated disconnect switch installed in the electrical circuit ahead of each motor starter

(b) Motor starting device

(c) Overload protection

~~(d) Where~~

~~WAGD~~
~~producer systems having two or more producers employ a control transformer or other voltage control power device, at least two such devices .~~

(2) WAGD source system controls shall be provided with electrical systems including at least:

(a) ~~Control circuits arranged in such a manner that the shutdown of one producer does not interrupt the operation of another producer .~~ Control circuits arranged so that failure of any component of the control circuit, or shutdown of one producer (e.g. for service) does not interrupt automatic operation of the standby producer

(b) Controls shall be provided with built in disconnect means to allow appropriate operation of multiple producer systems and protect service personnel from exposure to live voltages.

(c) Where components are common to more than one control circuit, the common device shall be provided with electrical protection to prevent loss of the control circuits(s) in the event of short circuit in the device.

(d) Automatic restart function such that the ~~pump~~ producer (s) will restart after power interruption without manual intervention

Statement of Problem and Substantiation for Public Input

Lack of language in NFPA 99 allows installation of equipment that does not comply with NFPA70E.
Current designs infield allow for blown fuse to shutdown complete WAGD system.

Submitter Information Verification

Submitter Full Name: Anthony Lowe
Organization: Allied Hospital Systems
Street Address:
City:
State:
Zip:
Submittal Date: Fri Jul 03 13:24:47 EDT 2015

Committee Statement

Resolution: FR-625-NFPA 99-2015

Statement: The standard was written around one type of control (on/off operation defined by pressure). Control methods for compressors and pumps are becoming more sophisticated and now can control on other conditions (e.g. flow) and in a variety of modes (e.g. continuous run with VSD). The proposed text attempts to account for these developments while preserving the performance characteristics inherent in the original text.

Previously the language of Item (C) potentially allowed the installation of equipment that did not comply with NFPA70E. The language of (C) and the new (D) has been revised to prevent this.

Public Input No. 135-NFPA 99-2015 [New Section after 5.1.3.8.5]

5.1.3.9* Oxygen Supply Systems Using Concentrator(s). Any oxygen central supply system which includes one or more oxygen concentrator unit(s) shall comply with 5.1.3.9.1 through 5.1.3.9.4

5.1.3.9.1 Location. Oxygen Supply Systems Using Concentrator(s) shall be located as per 5.1.3.3 as follows:

(1) Indoors in a dedicated mechanical equipment area, adequately ventilated and with any required utilities (e.g. electricity, drains, lighting).

(2) In a room ventilated per 5.1.3.3.3.3.

(3) For air cooled equipment, in a room designed to maintain the ambient temperature range as recommended by the manufacturer.

(4) Rooms containing Oxygen Supply Systems using Concentrators(s) which do not have the concentrator purge gas vented to outside shall be equipped with oxygen depletion monitors with alarm indicators at the entrance(s) which will indicate ambient oxygen levels below 19.5% in the room.

(5) Individual elements of the Oxygen Supply System Using Concentrator(s) shall be permitted to be located in separate rooms or enclosures as may be necessary to meet 5.1.3.9.1 (1) to (4).

5.1.3.9.2 Arrangement and Redundancies. Oxygen Supply Systems Using Concentrator(s) shall consist of three sources of supply, each capable of independently supplying the full system demand in the event of the unavailability of one or both of the other sources as follows:

(1) The three sources shall be permitted to be any of :

(a) an oxygen concentrator unit complying with 5.13.5.11. {reference is to new text}

(b) a cylinder header complying with 5.1.3.5.10 with sufficient cylinder connections for an average 12 hours use. Container manifolds as per 5.1.3.5.10 (9) shall not be used.

(c) a cryogenic liquid system complying with 5.1.3.13 or 5.1.3.14, in which arrangement the concentrator unit shall only operate as a secondary or reserve and never as the primary supply.

(2)* Use of oxygen concentrator units as all three sources shall only be permitted after a documented risk analysis by the governing authority of the healthcare facility indicating understanding of the inherent risks and defining how those risks shall be mitigated.

(3) An isolation valve and automatic check valve shall be provided to isolate each of the three sources from the others and from the pipeline. The valves in 5.1.3.5.10(4), 5.1.3.5.10(6), 5.1.3.5.11.10 {reference is to new text} and 5.1.3.5.11.11 {reference is to new text} shall be permitted to be used for this purpose.

(4) Each of the three sources shall be provided with a pressure relief valve complying with 5.1.3.5.6 on the source side of its' respective isolating valve.

(5)* The three sources shall join to the pipeline systems through control arrangements with at least the following characteristics:

(a) able to maintain stable pressures within the limits of Table 5.1.11, and

(b) able to flow 100% of the peak calculated demand, and

(c) redundant, such that each component of the control mechanism can be isolated for service or replacement while maintaining normal operation, and

(d) the cascade of sources described in 5.1.3.9.3, and

(e) protected against overpressure (see 5.1.3.5.6).

(6) A pressure relief valve shall be provided in the common line between the sources and the line pressure controls.

(7) A source valve as required in 5.1.4.2 shall be provided on the patient side of the line pressure controls.

(8) A gauge and switch or sensor shall be located between the three sources and the line pressure controls to monitor the pressure feeding the line pressure controls.

(9) An oxygen concentration monitor, sampling the gas on the patient side of the line pressure controls and on the source side of the source valve shall be provided with the following characteristics:

(a) the monitor shall be capable of monitoring 99% oxygen concentration with ±0.5% accuracy,

(b) the monitor shall be attached to the pipeline through a demand check complying with 5.1.8.2.3,

(c) the monitor shall continuously display the oxygen concentration and shall activate local alarm and master alarms indicating oxygen concentration low.

(10) A DN8 (NPS 1/4) valved sample port shall be provided on the patient side of the line pressure controls and source side of the source valve for sampling the oxygen.

(11) An auxiliary source connection shall be provided complying with 5.1.3.5.7.

(12) Electrical installation and wiring shall conform to the requirements of NFPA 70, National Electrical Code.

(13) Emergency electrical service for all components of the Oxygen Supply System shall conform to the requirements of the essential electrical system as described in Chapter 6.

5.1.3.9.3 Oxygen Supply Systems Using Concentrator(s) shall include means to provide the following functions:

(1) Selection of an appropriate primary source. When the primary source is in operation and oxygen quality is suitable, the secondary and reserve sources shall be prevented from supplying the system,

(2) Automatic activation of the secondary source if the primary source is not able to maintain supply pressure or concentration of oxygen,

(3) Automatic activation of the reserve source if the primary and secondary sources are not able to maintain supply pressure or concentration of oxygen,

(4) Where two or more concentrator units are included in the supply system, the oxygen concentrator units shall be permitted to rotate as primary source,

(5) Automatic operation such that the supply of gas will continue through interruption of the main electrical source,

(6) Oxygen concentrator unit(s) in the supply system shall be capable of automatically returning to normal operation following a power interruption. If required by the technology, it shall be permitted to isolate the concentrator unit(s) using the automatic valve(s) to restore normal oxygen concentration prior to reconnecting the oxygen concentrator unit to the supply system by opening the automatic valve. The valve may be actuated automatically for this purpose as an exception to 5.1.3.5.11.9 (3).

5.1.3.9.4 Operating Alarms and Local Signals

5.1.3.9.4.1 For each oxygen concentrator unit in the supply system, the unit's concentration monitor (see 5.1.3.5.11.10) *{reference is to submitted text}* shall:

(1) indicate low oxygen concentration when a concentration lower than 91% is observed,

(2) activate a local alarm (see 5.1.9.2),

(3) activate an alarm signal at the master alarms (see 5.1.9.2) indicating that the oxygen concentration from that concentrator is low,

(4) activate the automatic isolating valve for that oxygen concentrator unit (see 5.1.3.5.11.9) *{reference is to* submitted text} to prevent supply from that oxygen concentrator unit,

(5) closure of the automatic isolating valve for that oxygen concentrator unit (see 5.1.3.5.11.9) *{reference is to* submitted text} shall activate an alarm signal at the master alarms (see 5.1.9.2) indicating that oxygen concentrator unit is disconnected,

5.1.3.9.4.2 For the entire supply system, the system concentration monitor (see 5.1.3.9.2 (8)) shall:

(1) indicate low oxygen concentration when a concentration lower than 90% is observed,

(2) activate a local alarm (see 5.1.9.2),

(3) activate an alarm signal at the master alarms (see 5.1.9.2) indicating the oxygen concentration is low.

5.1.3.9.4.3 For each header source (see 5.1.3.5.10) in the supply system, local signals and alarms shall be provided as follows:

(1) a pressure gauge for delivery pressure,

(2) a means to activate an alarm signal at the master alarms (see 5.1.9.2) indicating the oxygen cylinders are in use,

(3) a means to activate an alarm signal at the master alarms (see 5.1.9.2) indicating the oxygen cylinder contents are low when the contents are at or below 12 hours average supply.

5.1.3.9.4.4 The Oxygen Supply Systems Using Concentrator(s) shall be provided with operating alarms as follows:

(1) Change of Source: An operating alarm shall be provided as follows:

(a) if the source in use fails to supply the system and is changed in accordance with 5.1.3.9.3 (2) or (3), a local alarm and a signal at the master alarms shall be activated, indicating an oxygen supply change has occurred,

(b) the signal in 5.1.3.9.4.4 (1) (a) will not be activated if the system has rotated sources in accordance with 5.1.3.9.3 (4),

(2) Internal Pressure Low. A local alarm and a signal at the master alarms shall be activated when or just before the pressure falls below the pressure required to drive the calculated required flow rate through the line pressure controls indicating the oxygen supply internal pressure is low (ref. 5.1.3.9.2 (7) for sensor location).

Statement of Problem and Substantiation for Public Input

Oxygen concentrators are a technology which has reached the level of reliability, economics and clinical acceptance that facilities are beginning to install and operate them, particularly in many situations outside of the U.S. where traditional supplies are expensive, unreliable or simply unobtainable. The NFPA is the last of the major international standards which does not provide guidance on their construction, installation and use.

The proposals attempt to address this, drawing primarily on the other international standards already in use as well as current practice with these supply sources, with adaptations appropriate to the conventions used in NFPA.

Also considered in the wording is an effort to assure that the common technologies now available (PSA and VSA) are both encompassed.

This section defines the common components required for the supply. The requirements draw primarily on the design of sources used elsewhere in the document and provide a primary, secondary and reserve with appropriate alarms for each stage of the cascade. Other proposals deal with the various elements under this consolidated central supply source.

The one unusual characteristic of this proposal is provision of an automatic valve. This valve is necessary because one mode of failure for concentrators is to produce progressively lower concentration at the same pressure, which would contaminate the gas going to the pipeline, so it is necessary to immediately isolate the system in the event of low concentration.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 132-NFPA 99-2015 [New Section after A.5.1.3.8.1]	
Public Input No. 133-NFPA 99-2015 [New Section after A.5.1.3.8.1]	
Public Input No. 134-NFPA 99-2015 [New Section after A.5.1.3.8.1]	
Public Input No. 136-NFPA 99-2015 [Section No. 5.1.3.3.1.1]	
Public Input No. 137-NFPA 99-2015 [Section No. 5.1.3.3.1.2]	
Public Input No. 138-NFPA 99-2015 [Section No. 5.1.3.3.1.3]	
Public Input No. 139-NFPA 99-2015 [New Section after 5.1.3.5.10]	
Public Input No. 140-NFPA 99-2015 [Section No. 5.1.9.2.4]	
Public Input No. 141-NFPA 99-2015 [Section No. 5.1.9.5.4]	
Public Input No. 142-NFPA 99-2015 [Section No. 5.1.12.3.11]	
Public Input No. 143-NFPA 99-2015 [New Section after 5.1.12.3.14.3]	
Public Input No. 144-NFPA 99-2015 [Section No. 5.1.14.4.7]	
Public Input No. 145-NFPA 99-2015 [New Section after 5.1.14.4.9]	
Public Input No. 146-NFPA 99-2015 [New Section after 5.2.3.5]	
Public Input No. 147-NFPA 99-2015 [New Section after 3.3.119]	
Public Input No. 150-NFPA 99-2015 [New Section after A.5.1.3.5.11]	

Submitter Information Verification

Submitter Full Name: MARK ALLEN
Organization: BEACON MEDAES
Street Address:
City:
State:
Zip:
Submittal Date: Mon May 25 11:45:59 EDT 2015

Committee Statement

Resolution: FR-640-NFPA 99-2015

Statement: Oxygen concentrators are a technology which has reached the level of reliability, economics and clinical acceptance that facilities are beginning to install and operate them, particularly in many situations outside of the U.S. where traditional supplies are expensive, unreliable or simply unobtainable.

A series of revisions attempt to address this, drawing on the other international standards already in use as well as current practice with these supply sources, with adaptations appropriate to the conventions used in NFPA.

Also considered in the wording is an effort to assure that the common technologies now available (PSA and VSA) are both encompassed.

This section defines the common components required for the supply. The requirements draw primarily on the design of sources used elsewhere in the document and provide requirements for designs with duplex or triplex arrangemnet with appropriate alarms for each stage of the cascade. Other proposals deal with the various elements under this consolidated central supply source.

The one unusual characteristic of this proposal is provision of an automatic valve. This valve is necessary because one mode of failure for concentrators is to produce progressively lower concentration at the same pressure, which would contaminate the gas going to the pipeline, so it is necessary to immediately isolate the system in the event of low concentration.

Public Input No. 38-NFPA 99-2015 [Section No. 5.1.4.1.6]

5.1.4.1.6 Valve Types.

New or replacement valves shall be permitted to be of any type as long as they meet the following conditions:

(1) They have a maximum pressure drop at intended maximum flow of 1.4 kPa (0.2 psig) in pressure service and 3.8 mm Hg (0.15 Hg) in vacuum service.

(2) They use a quarter turn to off.

(3) They are constructed of materials suitable for the service.

(4) They are provided with copper tube extensions with dual ports by the manufacturer for brazing.

(5) They indicate to the operator if the valve is open or closed.

(6) They permit in-line serviceability.

(7) They are cleaned for oxygen service by the manufacturer if used for any positive pressure service.

Statement of Problem and Substantiation for Public Input

This would help clarify the dual port valves we are looking for.

Submitter Information Verification

Submitter Full Name: John Gregory
Organization: HDR Architecture Inc.
Affilliation: P.I.P.E. Medical Gas Committee Phoenix AZ
Street Address:
City:
State:
Zip:
Submittal Date: Thu Apr 09 10:25:12 EDT 2015

Committee Statement

Resolution: While providing dual ports for purging might be considered a best practice, there has not been adequate technical justification for making this a requirement for all valve types as proposed in the input.

Public Input No. 496-NFPA 99-2015 [Section No. 5.1.4.1.6]

5.1.4.1.6 Valve Types.

New or replacement valves shall be permitted to be of any type as long as they meet the following conditions:

(1) They have a ~~maximum pressure drop at intended maximum flow of 1.4 kPa (0.2 psig) in pressure service and 3.8 mm Hg (0.15 Hg) in vacuum service. minimum Cv factor of:~~

~~Valve Size~~	~~Minimum Cv (full open)~~
~~1/2"~~	~~17~~
~~3/4"~~	~~31~~
~~1"~~	~~60~~
~~1 1/4"~~	~~110~~
~~1 1/2"~~	~~185~~
~~2"~~	~~115~~
~~2 1/2"~~	~~196~~
~~3"~~	~~302~~
~~4"~~	~~600~~
~~5"~~	~~1022~~
~~6"~~	~~1579~~
~~8"~~	~~3136~~

(2) They use a quarter turn to off.

(3) They are constructed of materials suitable for the service.

(4) They are provided with copper tube extensions by the manufacturer for brazing.

(5) They indicate to the operator if the valve is open or closed.

(6) They permit in-line serviceability.

(7) They are cleaned for oxygen service by the manufacturer if used for any positive pressure service.

Statement of Problem and Substantiation for Public Input

The 2012 NFPA 99 Chapt 5 codes and prior all included the requirement that valves be "full ported" and that they be ball valves. However, the 2012 also allowed butterfly valves for vacuum and WAGD services which was a contradiction. The requirement that valves be ball valves restricted technology. The current 2015 edition was an attempt to allow for new technology valves and to allow for both ball and butterfly valves. The problem is, the maximum pressure drop factors adopted in the 2015 code allow ball valve manufacturers to utilize internal components of smaller size(s) inside of larger size valve bodies. For example - a 2" ball assembly could be used inside a 2 1/2" ball valve. I don't believe this was the intent of the committee.

Submitter Information Verification

Submitter Full Name: JAMES LUCAS
Organization: TRI-TECH MEDICAL INC
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 16:38:52 EDT 2015

Committee Statement

Resolution: FR-650-NFPA 99-2015
Statement: The 2012 NFPA 99 Chapt 5 codes and prior all included the requirement that valves be "full ported" and that they be ball valves. However, the 2012 also allowed butterfly valves for vacuum and WAGD services which was a contradiction. The requirement that valves be ball valves restricted technology. The current 2015 edition was an attempt to allow for new technology valves and to allow for both ball and butterfly valves. The problem is, the maximum pressure drop factors adopted in the 2015 code allow ball valve manufacturers to utilize internal components of smaller size(s) inside of larger size valve bodies. For example - a 2" ball assembly could be used inside a 2 1/2" ball valve. This was not the intent of the committee and

this revision looks to make sure that this does not happen.

Public Input No. 127-NFPA 99-2015 [Section No. 5.1.4.2]

5.1.4.2 Source Valve.

5.1.4.2.1

A shutoff valve shall be placed at the immediate connection of each ~~source~~ central supply system to the piped distribution system to allow the entire ~~source~~ central supply system , including all accessory devices (e.g., air dryers, final line regulators), to be isolated from the facility.

5.1.4.2.2

The source valve shall be located in the immediate vicinity of the ~~source equipment~~ central supply system .

Statement of Problem and Substantiation for Public Input

The term Central Supply systems is quite important in using Chapter 5, but it is never formally defined. The term central supply system is used as is the term "Supply Source" but the usage is not entirely consistent. The proposal attempts to improve this.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 112-NFPA 99-2015 [New Section after 3.3.22]	Parent

Submitter Information Verification

Submitter Full Name: MARK ALLEN
Organization: BEACON MEDAES
Street Address:
City:
State:
Zip:
Submittal Date: Mon May 25 10:43:17 EDT 2015

Committee Statement

Resolution: FR-601-NFPA 99-2015
Statement: terminology

Public Input No. 43-NFPA 99-2015 [Section No. 5.1.4.5]

5.1.4.5 Service Valves (Branch valves) .

5.1.4.5.1

Service valves (Branch valves) shall be installed to allow servicing or modification of lateral branch piping from a main or riser without shutting down the entire main, riser, or facility.

5.1.4.5.2

Only one service valve (Branch valve) shall be required for each branch off of a riser, regardless of how many zone valve boxes are installed on that lateral.

5.1.4.5.3

Service valves (Branch valves) shall be placed in the branch piping prior to any zone valve box assembly on that branch.

5.1.4.5.4 Service valves (Branch valves) shall be located in any one of the following areas:

(1) Behind a locked access door

(2) Locked open above a ceiling

(3) Locked open in a secure area

5.1.4.5.5 Service valves (Branch valves) shall be labeled in accordance with 5.1.11.2.

Additional Proposed Changes

File Name	Description	Approved
PC_12_PIP.pdf	NFPA 99_PC12	

Statement of Problem and Substantiation for Public Input

NOTE: The following Public Input appeared as “Reject but Hold” in Public Comment No. 12 of the (A2014) Second Draft Report for NFPA 99 and per the Regs. At 4.4.8.3.1.
Most installers I know refer to service valves as branch valves. Adding branch valves in () next to the service valve section eliminates any confusion or someone specifically looking for the words "branch valves" in the standard/code.

Submitter Information Verification

Submitter Full Name: TC ON HEA-PIP
Organization: NFPA
Street Address:
City:
State:
Zip:
Submittal Date: Thu Apr 09 13:44:22 EDT 2015

Committee Statement

Resolution: Using two terms for the same valves will be confusing to the user.

Public Input No. 367-NFPA 99-2015 [Section No. 5.1.4.6.8]

5.1.4.6.8

A zone valve shall be located immediately outside each vital life-support area, ~~critical care area~~ Category 1 space , and anesthetizing location of moderate sedation, deep sedation, or general anesthesia, in each medical gas or vacuum line, or both, and located so as to be readily accessible in an emergency.

Statement of Problem and Substantiation for Public Input

Definition for Critical Care Area is covered in NFPA 99: 3.3.137 Patient Care Spaceand is designated as Category 1 Space. Any references in NFPA 99 to “Critical Care Area” should be changed to “Category 1 Space”.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 357-NFPA 99-2015 [Section No. 3.3.28]	

Submitter Information Verification

Submitter Full Name: GARY BECKSTRAND
Organization: UTAH ELECTRICAL JATC
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jul 05 12:10:45 EDT 2015

Committee Statement

Resolution: FR-604-NFPA 99-2015
Statement: temrinology

Public Input No. 456-NFPA 99-2015 [Section No. 5.1.5]

5.1.5* Station Outlets/Inlets.

5.1.5. 1 Station outlets/Inlets shall be located per the FGI Guidelines for Design and Construction of Hospitals and Outpatient Facilities or other federal, state or local codes.

5. 1.5.2

Each station outlet/inlet for medical gases or vacuums shall be gas-specific, whether the outlet/inlet is threaded or is a noninterchangeable quick coupler.

5.1.5.~~2~~ 3

Each station outlet shall consist of a primary and a secondary valve (or assembly).

5.1.5.~~3~~ 4

Each station inlet shall consist of a primary valve (or assembly) and shall be permitted to include a secondary valve (or assembly).

5.1.5.~~4~~ 5

The secondary valve (or assembly) shall close automatically to stop the flow of gas (or vacuum, if provided) when the primary valve (or assembly) is removed.

5.1.5.~~5~~ 6

Each outlet/inlet shall be legibly identified in accordance with 5.1.11.3.

5.1.5.~~6~~ 7

Threaded outlets/inlets shall be non-interchangeable connections complying with the mandatory requirements of CGA V-5, *Diameter-Index Safety System (Noninterchangeable Low Pressure Connections for Medical Gas Applications)*.

5.1.5.~~7~~ 8

Each station outlet/inlet, including those mounted in columns, hose reels, ceiling tracks, or other special installations, shall be designed so that parts or components that are required to be gas-specific for compliance with 5.1.5.1 and 5.1.5.9 cannot be interchanged between the station outlet/inlet for different gases.

5.1.5.~~8~~ 9

The use of common parts in outlets/inlets, such as springs, O-rings, fasteners, seals, and shutoff poppets, shall be permitted.

5.1.5.~~9~~ 10

Components of a vacuum station inlet necessary for the maintenance of vacuum specificity shall be legibly marked to identify them as components or parts of a vacuum or suction system.

5.1.5.~~10~~ 11

Components of inlets not specific to a vacuum shall not be required to be marked.

5.1.5.~~11~~ 12

Factory-installed copper inlet tubes on station outlets extending no further than 205 mm (8 in.) from the body of the terminal shall be not less than DN8 (NPS ¼) (⅜ in. O.D.) size, with 8 mm (0.3 in.) minimum inside diameter.

5.1.5.~~12~~ 13

Factory-installed copper outlet tubes on station inlets extending no further than 205 mm (8 in.) from the body of the terminal shall be not less than DN10 (NPS ⅜) (½ in. O.D.) size, with 10 mm (0.4 in.) minimum inside diameter.

5.1.5.~~13~~ 14

Station outlets/inlets shall be permitted to be recessed or otherwise protected from damage.

5.1.5.~~14~~ 15

When multiple wall outlets/inlets are installed, they shall be spaced to allow the simultaneous use of adjacent outlets/inlets with any of the various types of therapy equipment.

5.1.5.~~15~~ 16

Station outlets in systems having nonstandard operating pressures shall meet the following additional requirements:

(1) They shall be gas-specific.

(2) They shall be pressure-specific where a single gas is piped at more than one operating pressure [e.g., a station outlet for oxygen at 550 kPa (80 psi) shall not accept an adapter for oxygen at 345 kPa (50 psi)].

(3) If operated at a pressure in excess of 550 kPa (80 psi), they shall be either D.I.S.S. connectors or comply with 5.1.5.15 (4).

(4) If operated at a gauge pressure between 1380 kPa and 2070 kPa (200 psi and 300 psi), the station outlet shall be designed so as to prevent the removal of the adapter until the pressure has been relieved to prevent the adapter injuring the user or others when removed from the outlet.

5.1.5.~~16~~ 17

WAGD networks shall provide a WAGD inlet in all locations where nitrous oxide or halogenated anesthetic gas is intended to be administered.

5.1.5.~~16~~ 17 .1

Station inlets for WAGD service shall have the following additional characteristics:

(1) They shall not be interchangeable with any other systems, including medical–surgical vacuum.

(2) Components necessary for the maintenance of WAGD specificity shall be legibly marked to identify them as components of a WAGD inlet.

(3) They shall be of a type appropriate for the flow and vacuum level required by the facility's gas anesthetic machines.

(4) They shall be located to avoid physical damage to the inlet.

Additional Proposed Changes

File Name	Description	Approved
2014_FGI-Guidelines_HOP_Table_2.1-4.pdf	Station outlet locations in FGI Guidelines	

Statement of Problem and Substantiation for Public Input

The FGI Guidelines provides the number and location of devices for hospitals. NFPA 99 doesn't provide any information on where station outlets should be located. NFPA 99 should not try to duplicate the FGI, just simply provide a reference to it so that designers know where to look for this information.

Submitter Information Verification

Submitter Full Name: CHAD BEEBE
Organization: ASHE - AHA
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 14:59:15 EDT 2015

Committee Statement

Resolution: FR-628-NFPA 99-2015
Statement: Annex note has been added to include reference ot the FGI guidelines for the minimum number of outlets/inlets required.

New 5.1.5.17 was added to prevent instances of hose assemblies occasionally disconnecting from quick connect outlets. DISS outlets provide a much safer / secure connection.

Public Input No. 181-NFPA 99-2015 [New Section after 5.1.6.1]

TITLE OF NEW CONTENT

Type your content here ...5.1.5.17 When installed in a down facing position (such as in a ceiling or ceiling column) station outlets / inlets shall be DISS.

Statement of Problem and Substantiation for Public Input

We have received numerous reports from hospitals and certifiers of hose assemblies occasionally disconnecting from quick connect outlets. DISS outlets provide a much safer / secure connection.

Submitter Information Verification

Submitter Full Name: JAMES LUCAS
Organization: TRI-TECH MEDICAL INC
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jun 04 16:19:11 EDT 2015

Committee Statement

Resolution: FR-628-NFPA 99-2015
Statement: Annex note has been added to include reference ot the FGI guidelines for the minimum number of outlets/inlets required.

New 5.1.5.17 was added to prevent instances of hose assemblies occasionally disconnecting from quick connect outlets. DISS outlets provide a much safer / secure connection.

Public Input No. 319-NFPA 99-2015 [Section No. 5.1.6.1]

5.1.6.1

Manufactured assemblies shall be pretested by the manufacturer prior to arrival at the installation site in accordance with the ~~following:~~

(1) ~~- Initial blowdown test per 5.1.12.2.2~~

(2) ~~- Initial pressure test per 5.1.12.2.3~~

(3) ~~- Piping purge test per 5.1.12.2.5~~

(4) ~~- Standing pressure test per 5.1.12.2.6 or 5.1.12.2.7 , except as permitted under 5.1.6.2~~

manufacturer's test proceedures:

(1)

(2)

(3)

(4)

Statement of Problem and Substantiation for Public Input

It is unrealistic to require:

* a 24 hour standing pressure test for manufactured assemblies
* manufacturers to use leak test solution.
* small assemblies to undergo and the same testing as a piping system

Because of the small volume of pressurized gas in a manufactured assembly, any leaks will be detected much more readily using pressure decay testing generally of a short duration.

Submitter Information Verification

Submitter Full Name: JAMES LUCAS
Organization: TRI-TECH MEDICAL INC
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jul 02 16:14:17 EDT 2015

Committee Statement

Resolution: It is important to require specific tests to be conducted by the manufacture rather than their own procedures. Leaving it up to the manufacturer's procedures could allow them to have procedures that call for limited to no testing. Providing a minimum set of tests prevents this.

Public Input No. 307-NFPA 99-2015 [Section No. 5.1.6.2]

5.1.6.2 –

~~The standing pressure test under 5.1.6.1 (4) shall be permitted to be performed by any testing method that will ensure a pressure decay of less than 1 percent in 24 hours.~~

The leakage from a completed manufactured assembly shall not exceed 0.5% of the starting pressure when tested at 20% above operating pressure for pressure pipelines and 635 mmHg (25 inHgV) for vacuum and WAGD systems (e.g. 2 kPa (0.3 psi) starting at 415 kPa (60 psig), 0.3 mmHg (0.125) inHg starting at 635 mmHg (25 inHgV))

Statement of Problem and Substantiation for Public Input

The leakage requirements as currently stated are in fact physically impossible. All systems leak to some extent, and the only reason we can pass the current requirement at all is that we use gauges which naturally have a limit on their readability and resolution. Therefore we can "fudge" the "no change in the test pressure" required by the standard.
As gauges are improving, becoming more precise and digital, it is increasingly difficult to rely on this anachronism to pass the test. As a result, failures are being reported on processes which formerly passed. It is clear we have grown out of this requirement and need something more realistic and fitting the real conditions.
Worse, there are two mutually contradictory tests given. 5.1.6.2 permits a loss from a manufactured assembly of of 1% of the starting pressure in 24 hours. 5.1.12.2.6.5 and permits no loss from the piping system in 24 hours. Clearly, a product can pass the factory test and fail the field test - if the gauge is accurate.

Submitter Information Verification

Submitter Full Name: MARK ALLEN
Organization: BEACON MEDAES
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jul 01 15:26:28 EDT 2015

Committee Statement

Resolution: FR-642-NFPA 99-2015

Statement: The leakage requirements as currently stated are essentially impossible to meet. All systems leak to some extent, and the only reason one can pass the current requirement at all is through the use of gauges which naturally have a limit on their readability and resolution. Therefore a user can "fudge" the "no change in the test pressure" required by the standard.

As gauges are improving, becoming more precise and digital, it is increasingly difficult to rely on this anachronism to pass the test. As a result, failures are being reported on processes which formerly passed. It is clear technology has grown out of this requirement and need something more realistic and fitting the real conditions.

Worse, there are two mutually contradictory tests given. 5.1.6.2 permits a loss from a manufactured assembly of of 1% of the starting pressure in 24 hours. 5.1.12.2.6.5 and permits no loss from the piping system in 24 hours. This revision along with others are meant to fix these issues.

Public Input No. 320-NFPA 99-2015 [Section No. 5.1.6.2]

5.1.6.2

~~The standing pressure test under 5.1.6.1 (4) shall be permitted to be performed by any testing method that will ensure a pressure decay of less than 1 percent in 24 hours.~~

Manufacturer's test proceedures shall include:

(1) Blowdown test

(2) Pressure test

(3) Purge test

Statement of Problem and Substantiation for Public Input

It is unrealistic to require:

* a 24 hour standing pressure test for manufactured assemblies
* manufacturers to use leak test solution.
* small assemblies to undergo and the same testing as a piping system

Because of the small volume of pressurized gas in a manufactured assembly, any leaks will be detected much more readily using pressure decay testing generally of a short duration.

Submitter Information Verification

Submitter Full Name: JAMES LUCAS
Organization: TRI-TECH MEDICAL INC
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jul 02 16:33:23 EDT 2015

Committee Statement

Resolution: It is important to require specific tests to be conducted by the manufacture rather than their own procedures. Leaving it up to the manufacturer's procedures could allow them to have procedures that call for limited to no testing. Providing a minimum set of tests prevents this.

Public Input No. 425-NFPA 99-2015 [New Section after 5.1.6.4]

5.1.6.5

The manufacturer of the assembly shall provide documentation certifying that the flexible hose assembly has a minimum burst gauge pressure of 6895 kPa (1000 psi).

Statement of Problem and Substantiation for Public Input

Many manufacturers of these assemblies are not using high pressure hose or flex connectors. Also, often times there are no markings on the hoses to allow for verification that the assemblies meet this requirement. This will give the verify documentation certifying that the assembly meets the requirement.

Submitter Information Verification

Submitter Full Name: JONATHAN WILLARD
Organization: ACUTE MEDICAL GAS SERVICES
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 12:35:43 EDT 2015

Committee Statement

Resolution: FR-644-NFPA 99-2015
Statement: The committee has been advised that some manufacturers of these assemblies are not using high pressure hose or flex connectors and that often times there are no markings on the hoses to allow for verification that the assemblies meet this requirement. This revision will give the verification documentation certifying that the assembly meets the requirement.

Public Input No. 299-NFPA 99-2015 [Section No. 5.1.6.5]

5.1.6.5

Manufactured assemblies shall have a flame spread index of not greater than 200 when tested in accordance with ASTM E 84, *Standard Test Method for Surface Burning Characteristics of Building Materials*, or ANSI/UL 723, *Standard for Test for Surface Burning Characteristics of Building Materials* , or shall comply with the requirements for heat release in accordance with NFPA 286, *Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth*, as described in Section 10.2 of NFPA *101*, *Life Safety Code*.

Statement of Problem and Substantiation for Public Input

ANSI/UL 723 is an equivalent standard to ASTM E 84 for testing surface burning characteristics of building materials. In all other sections in NFPA 99 where ASTM E 84 is required, ANSI/UL 723 is identified as an alternate test method (Sections 4.4.2.3, 4.4.2.4, and 14.2.2.5.1).

Submitter Information Verification

Submitter Full Name: RONALD FARR
Organization: UL LLC
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jul 01 08:54:45 EDT 2015

Committee Statement

Resolution: FR-676-NFPA 99-2015
Statement: ANSI/UL 723 is an equivalent standard to ASTM E 84 for testing surface burning characteristics of building materials. In all other sections in NFPA 99 where ASTM E 84 is required, ANSI/UL 723 is identified as an alternate test method (Sections 4.4.2.3, 4.4.2.4, and 14.2.2.5.1).

Public Input No. 140-NFPA 99-2015 [Section No. 5.1.9.2.4]

5.1.9.2.4

Master alarm panels for medical gas and vacuum systems shall each include the following signals:

(1) Alarm indication when, or just before, changeover occurs in a medical gas system that is supplied by a manifold or other alternating-type bulk system that has as a part of its normal operation a changeover from one portion of the operating supply to another

(2) Alarm indication for a bulk cryogenic liquid system when the main supply reaches an average day's supply, indicating low contents

(3) Alarm indication when, or just before, the changeover to the reserve supply occurs in a medical gas system that consists of one or more units that continuously supply the piping system while another unit remains as the reserve supply and operates only in the case of an emergency

(4) Alarm indication for cylinder reserve pressure low when the content of a cylinder reserve header is reduced below one average day's supply

(5) For bulk cryogenic liquid systems, an alarm when or at a predetermined set point before the reserve supply contents fall to one day's average supply, indicating reserve low

(6) Where a cryogenic liquid storage unit is used as a reserve for a bulk supply system, an alarm indication when the gas pressure available in the reserve unit is below that required for the medical gas system to function

(7) Alarm indication when the pressure in the main line of each separate medical gas system increases 20 percent or decreases 20 percent from the normal operating pressure

(8) Alarm indication when the medical–surgical vacuum pressure in the main line of each vacuum system drops to or below 300 mm (12 in.) gauge HgV

(9) Alarm indication(s) from the local alarm panel(s) as described in 5.1.9.5.2 to indicate when one or more of the conditions being monitored at a site is in alarm

(10) Medical air dew point high alarm from each compressor site to indicate when the line pressure dew point is greater than ± 2°C (± 35°F)

(11) WAGD low alarm when the WAGD vacuum level or flow is below effective operating limits

(12) An instrument air dew point high alarm from each compressor site to indicate when the line pressure dew point is greater than −30°C (−22°F)

(13) Alarm indication if the primary or reserve production stops on a proportioning system

(14) When oxygen is supplied from an Oxygen Supply System Using Concentrators (ref. 5.1.3.9), the following signals shall be provided:

(a) for each concentrator unit used in the Oxygen Supply System, an alarm indication that oxygen concentration from that oxygen concentrator unit is below 91%,

(b) for each oxygen concentrator unit used in the Oxygen Supply System, an alarm indication that the isolating valve for that oxygen concentrator unit is closed and the unit is isolated,

(c) for each cylinder header used as a source, an alarm indication that the header is in use,

(d) for each cylinder header used as a source, an alarm indication that the cylinder contents are below a normal 12 hour supply,

(e) if the source in use changes because of a failure to appropriately supply the system, an alarm indication indicating an unexpected oxygen supply change has occurred,

(f) an alarm indication that the pressure in the common line on the source side of the line pressure controls is low,

(g) an alarm indication that the that oxygen concentration from the supply system is below 90%.

Statement of Problem and Substantiation for Public Input

These alarms are needed to support the Concentrator supply system

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 135-NFPA 99-2015 [New Section after 5.1.3.8.5]	Parent

Submitter Information Verification

Submitter Full Name: MARK ALLEN
Organization: BEACON MEDAES
Street Address:
City:
State:
Zip:
Submittal Date: Mon May 25 12:11:55 EDT 2015

Committee Statement

Resolution: FR-641-NFPA 99-2015
Statement: This revision adds requirements for alarms are needed to support the Concentrator supply system

Public Input No. 429-NFPA 99-2015 [Section No. 5.1.9.2.4]

5.1.9.2.4

Master alarm panels for medical gas and vacuum systems shall each include the following signals:

(1) Alarm indication when, or just before, changeover occurs in a medical gas system that is supplied by a manifold or other alternating-type bulk system that has as a part of its normal operation a changeover from one portion of the operating supply to another

(2) Alarm indication for a bulk cryogenic liquid system when the main supply reaches an average day's supply, indicating low contents

(3) Alarm indication when, or just before, the changeover to the reserve supply occurs in a medical gas system that consists of one or more units that continuously supply the piping system while another unit remains as the reserve supply and operates only in the case of an emergency

(4) Alarm indication for cylinder reserve pressure low when the content of a cylinder reserve header is reduced below one average day's supply

(5) For bulk cryogenic liquid systems, an alarm when or at a predetermined set point before the reserve supply contents fall to one day's average supply, indicating reserve low

(6) Where a cryogenic liquid storage unit is used as a reserve for a bulk supply system, an alarm indication when the gas pressure available in the reserve unit is below that required for the medical gas system to function

(7) Alarm indication when the pressure in the main line of each separate medical gas system increases 20 percent or decreases 20 percent from the normal operating pressure

(8) Alarm indication when the medical–surgical vacuum pressure in the main line of each vacuum system drops to or below 300 mm (12 in.) gauge HgV

(9) Alarm indication(s) from the local alarm panel(s) as described in 5.1.9.5.2 to indicate when one or more of the conditions being monitored at a site is in alarm

(10) Medical air dew point high alarm from each compressor site to indicate when the line pressure dew point is greater than ~~+2°C (+35°F)~~

(11) WAGD low alarm when the WAGD vacuum level or flow is below effective operating limits

(12) An instrument air dew point high alarm from each compressor site to indicate when the line pressure dew point is greater than ~~−30°C (−22°F)~~

(13) Alarm indication if the primary or reserve production stops on a proportioning system

Statement of Problem and Substantiation for Public Input

This is a placeholder for the Task Group #1 discussion.

Submitter Information Verification

Submitter Full Name: JONATHAN WILLARD
Organization: ACUTE MEDICAL GAS SERVICES
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 13:03:52 EDT 2015

Committee Statement

Resolution: The committee is open to receiving more research and analysis of dew point requirements. The discussion in the meeting resolved that there is not a clinical concern at any of the possible levels since for clinical applications, the air is needed to be humidifies regardless. The analysis should review what dew point levels can result in water in a pipeline or water causing mechanical damage.

Public Input No. 369-NFPA 99-2015 [Section No. 5.1.9.4 [Excluding any Sub-Sections]]

Area alarm panels shall be provided to monitor all medical gas, medical–surgical vacuum, and piped WAGD systems supplying the following:

(1) Anesthetizing locations where moderate sedation, deep sedation, or general anesthesia is administered

(2)* ~~Critical care areas~~ Categroy 1 space

Statement of Problem and Substantiation for Public Input

Definition for Critical Care Area is covered in NFPA 99: 3.3.137 Patient Care Space and is designated as Category 1 Space. Any references in NFPA 99 to “Critical Care Area” should be changed to “Category 1 Space”.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 357-NFPA 99-2015 [Section No. 3.3.28]	

Submitter Information Verification

Submitter Full Name: GARY BECKSTRAND
Organization: UTAH ELECTRICAL JATC
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jul 05 12:13:30 EDT 2015

Committee Statement

Resolution: FR-604-NFPA 99-2015
Statement: temrinology

Public Input No. 331-NFPA 99-2015 [New Section after 5.1.9.4.4]

5.1.9.4.6

One area alarm panel shall be acceptable to monitor multiple room location within an immediate vicinity meeting the requirements of 5.1.9.4.4(2)

Statement of Problem and Substantiation for Public Input

Clarification of 5.1.9.4.4(2) to clarify the use of one area alarm panel for an operating room suite

Submitter Information Verification

Submitter Full Name: Anthony Lowe
Organization: Allied Hospital Systems
Street Address:
City:
State:
Zip:
Submittal Date: Fri Jul 03 10:57:01 EDT 2015

Committee Statement

Resolution: FR-629-NFPA 99-2015
Statement: This revision is an attempted clarification of 5.1.9.4.4(2) to show that the use of one area alarm panel for an operating room suite is permissible.

Public Input No. 370-NFPA 99-2015 [Section No. 5.1.9.4.4]

5.1.9.4.4

Alarm sensors for area alarms shall be located as follows:

(1) * ~~Critical care areas~~ Category 1 space shall have the alarm sensors installed on the patient or use side of each individual zone valve box assemblies.

(2) * Anesthetizing locations where moderate sedation, deep sedation, or general anesthesia is administered shall have the sensors installed either on the source side of any of the individual room zone valve box assemblies or on the patient or use side of each of the individual zone valve box assemblies.

Statement of Problem and Substantiation for Public Input

Definition for Critical Care Area is covered in NFPA 99: 3.3.137 Patient Care Space and is designated as Category 1 Space. Any references in NFPA 99 to “Critical Care Area” should be changed to “Category 1 Space”.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 357-NFPA 99-2015 [Section No. 3.3.28]	

Submitter Information Verification

Submitter Full Name: GARY BECKSTRAND
Organization: UTAH ELECTRICAL JATC
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jul 05 12:15:36 EDT 2015

Committee Statement

Resolution: FR-604-NFPA 99-2015
Statement: temrinology

Public Input No. 128-NFPA 99-2015 [Section No. 5.1.9.5.1]

5.1.9.5.1

The signals referenced in 5.1.9.5.4 shall be permitted to be located as follows:

(1) On or in the control panel(s) for the ~~machinery~~ central supply system or supply source being monitored

(2) Within a monitoring device (e.g., dew point monitor or carbon monoxide monitor)

(3) On a separate alarm panel(s)

Statement of Problem and Substantiation for Public Input

The term Central Supply systems is quite important in using Chapter 5, but it is never formally defined. The term central supply system is used as is the term "Supply Source" but the usage is not entirely consistent. The proposal attempts to improve this.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 112-NFPA 99-2015 [New Section after 3.3.22]	Parent

Submitter Information Verification

Submitter Full Name: MARK ALLEN
Organization: BEACON MEDAES
Street Address:
City:
State:
Zip:
Submittal Date: Mon May 25 10:46:26 EDT 2015

Committee Statement

Resolution: FR-601-NFPA 99-2015
Statement: terminology

Public Input No. 330-NFPA 99-2015 [Section No. 5.1.9.5.2]

5.1.9.5.2

The master alarm shall include at least one signal from the source equipment to

~~indicate a problem with~~

indicate any local alarms with the source equipment at this location.

~~This master alarm signal shall activate when any of the required local alarm signals for this source equipment activates.~~

Statement of Problem and Substantiation for Public Input

Clarification of intent of the local alarm to master alarm

Submitter Information Verification

Submitter Full Name: Anthony Lowe
Organization: Allied Hospital Systems
Street Address:
City:
State:
Zip:
Submittal Date: Fri Jul 03 10:35:41 EDT 2015

Committee Statement

Resolution: The proposed new language will add confusion. It is not a clarification of the current requirement as suggested in the substantiation, as it changes how the requirement would be applied from where it currently stands.

Public Input No. 129-NFPA 99-2015 [Section No. 5.1.9.5.3]

5.1.9.5.3 – If there is more than one ~~medical air compressor system, instrument air compressor system, WAGD system, medical–surgical vacuum pump system, or proportioning system at different locations in the facility, or if the compressors and vacuum sources are in different locations in the facility~~ central supply system for a specific gas or vacuum pipeline or more than one central supply system and pipeline for the same gas in the building , then it shall be necessary for each location to have separate local alarms per 5.1.9.5.4 and signals at the master panels per 5 . 1.9.2.4

Statement of Problem and Substantiation for Public Input

The term Central Supply systems is quite important in using Chapter 5, but it is never formally defined. The term central supply system is used as is the term "Supply Source" but the usage is not entirely consistent. The proposal attempts to improve this.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 112-NFPA 99-2015 [New Section after 3.3.22]	Parent

Submitter Information Verification

Submitter Full Name: MARK ALLEN
Organization: BEACON MEDAES
Street Address:
City:
State:
Zip:
Submittal Date: Mon May 25 10:47:52 EDT 2015

Committee Statement

Resolution: FR-601-NFPA 99-2015
Statement: terminology

Public Input No. 141-NFPA 99-2015 [Section No. 5.1.9.5.4]

5.1.9.5.4

The following functions shall be monitored at each local alarm site:

(1) Backup or lag compressor in operation, to indicate when the primary or lead air compressor is incapable of satisfying the demand of the requirements of the system, except when the medical air system consists of three or more compressors, in which case the backup or lag signal is permitted to energize when the last compressor has been signaled to start

(2) High carbon monoxide level, to indicate when the carbon monoxide level in the medical air system is 10 ppm or higher

(3) Medical air dew point high, to indicate when the line pressure dew point is greater than ± 2°C (± 35°F)

(4) Backup or lag vacuum pump in operation, to indicate when the primary or lead vacuum pump is incapable of satisfying the demand of the requirements of the system, except when the vacuum pump system consists of three or more pumps, in which case the backup or lag signal is permitted to energize when the last pump has been signaled to start

(5) When a central dedicated WAGD producer is provided per 5.1.3.8.1.3, WAGD lag in use with the signal to be manually reset

(6) Instrument air dew point high, to indicate when the line pressure dew point is greater than -30°C (-22°F)

(7) For compressor systems using liquid ring compressors or compressors with water-cooled components, high water in the receiver tank, to indicate when the water level in the receiver tank, has reached a level determined to be detrimental to the operation of the system

(8) For compressor systems using liquid ring compressors, high water in the separators

(9) For compressor systems using other than liquid ring compressors, high discharge air temperature

(10) Proportioning systems high/low indicator when the oxygen concentration is outside 19.5 percent to 23.5 percent oxygen

(11) Proportion systems reserve system in operation

(12) When oxygen is supplied from an Oxygen Supply System Using Concentrators (ref. 5.1.3.9), the following signals shall be provided at the system's local alarm site(s):

(a) for each cylinder header used as a source, an alarm indication that the header is in use,

(b) for each cylinder header used as a source, an alarm indication that the cylinder contents are below a normal 12 hour supply,

(c) if the source in use changes because of a failure to appropriately supply the system, an alarm indication indicating an unexpected oxygen supply change has occurred,

(d) an alarm indication that the pressure in the common line on the source side of the line pressure controls is low,

(e) an alarm indication that the that oxygen concentration from the supply system is below 90%.

Statement of Problem and Substantiation for Public Input

These alarm are needed to support he concentrator supply system.

With concentrators, not all alarms will appear at the local which appear at the master. This is because locally there are other indicators that are more useful (e.g. the oxygen concentration monitors, pressure gauges, isolation valves)

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 135-NFPA 99-2015 [New Section after 5.1.3.8.5]	Parent

Submitter Information Verification

Submitter Full Name: MARK ALLEN
Organization: BEACON MEDAES
Street Address:
City:
State:
Zip:
Submittal Date: Mon May 25 12:13:55 EDT 2015

Committee Statement

Resolution: FR-630-NFPA 99-2015

Statement: The standard was written around one type of control (on/off operation defined by pressure). Control methods for compressors and pumps are becoming more sophisticated and now can control on other conditions (e.g. flow) and in a variety of modes (e.g. continuous run with VSD). The revised text attempts to account for these developments while preserving the performance characteristics inherent in the original text.

Instrument air has been added to this list - it appears to have been an omission.

New alarm requirements have been added to support the new oxygen concentrator supplies.

Public Input No. 157-NFPA 99-2015 [Section No. 5.1.9.5.4]

5.1.9.5.4

The following functions shall be monitored at each local alarm site:

(1) ~~Backup or lag compressor in operation~~ Low Medical Air Reserve Capacity , to indicate when the ~~primary or lead~~ medical air ~~compressor is incapable of satisfying the demand of the requirements of the system, except when the medical air system consists of three or more compressors, in which case the backup or lag signal is permitted to energize when the last compressor has been signaled to start~~ source is operating under a demand which could not be managed if one compressor ceased to operate.

(2) High carbon monoxide level, to indicate when the carbon monoxide level in the medical air system is 10 ppm or higher

(3) Medical air dew point high, to indicate when the line pressure dew point is greater than ± 2°C (± 35°F)

~~Backup or lag vacuum pump in operation~~

(4) Low Medical Vacuum Reserve Capacity , to indicate when the

~~primary or lead~~
medical vacuum

~~pump is incapable of satisfying the demand of the requirements of the system, except when the vacuum pump system consists of three or more pumps, in which case the backup or lag signal is permitted to energize when the last pump has been signaled to start~~

- ~~When a central dedicated WAGD producer is provided per 5.1.3.8.1.3 , WAGD lag in use with the signal to be manually reset~~

source is operating under a demand which could not be managed if one pump ceased to operate.

(5) Low WAGD Reserve Capacity, to indicate when the WAGD source is operating under a demand which could not be managed if one producer ceased to operate,

(6) Instrument air dew point high, to indicate when the line pressure dew point is greater than -30°C (-22°F)

(7) Low Instrument Air Reserve Capacity (if instrument air is provided by a source with more than one compressor) to indicate when the instrument air source is operating under a demand which could not be managed if one compressor ceased to operate.

(8) For compressor systems using liquid ring compressors or compressors with water-cooled components, high water in the receiver tank, to indicate when the water level in the receiver tank, has reached a level determined to be detrimental to the operation of the system

(9) For compressor systems using liquid ring compressors, high water in the

~~separators~~
separator,

(10) For compressor systems using other than liquid ring compressors, high discharge air

~~temperature~~
temperatur e

(11) Proportioning systems high/low indicator when the oxygen concentration is outside 19.5 percent to 23.5 percent oxygen

(12) Proportion systems reserve system in operation

Statement of Problem and Substantiation for Public Input

The standard was written around one type of control (on/off operation defined by pressure). Control methods for compressors and pumps are becoming more sophisticated and now can control on other conditions (e.g. flow) and in a variety of modes (e.g. continuous run with VSD). The proposed text attempts to account for these developments while preserving the performance characteristics inherent in the original text.
Instrument air has been added to this list - it appears to have been an omission.

Submitter Information Verification

Submitter Full Name: MARK ALLEN
Organization: BEACON MEDAES
Street Address:
City:
State:
Zip:
Submittal Date: Mon May 25 13:40:26 EDT 2015

Committee Statement

Resolution: FR-630-NFPA 99-2015

Statement: The standard was written around one type of control (on/off operation defined by pressure). Control methods for compressors and pumps are becoming more sophisticated and now can control on other conditions (e.g. flow) and in a variety of modes (e.g. continuous run with VSD). The revised text attempts to account for these developments while preserving the performance characteristics inherent in the original text.

Instrument air has been added to this list - it appears to have been an omission.

New alarm requirements have been added to support the new oxygen concentrator supplies.

Public Input No. 430-NFPA 99-2015 [Section No. 5.1.9.5.4]

5.1.9.5.4

The following functions shall be monitored at each local alarm site:

(1) Backup or lag compressor in operation, to indicate when the primary or lead air compressor is incapable of satisfying the demand of the requirements of the system, except when the medical air system consists of three or more compressors, in which case the backup or lag signal is permitted to energize when the last compressor has been signaled to start

(2) High carbon monoxide level, to indicate when the carbon monoxide level in the medical air system is 10 ppm or higher

(3) Medical air dew point high, to indicate when the line pressure dew point is greater than ~~+2°C (+35°F)~~

(4) Backup or lag vacuum pump in operation, to indicate when the primary or lead vacuum pump is incapable of satisfying the demand of the requirements of the system, except when the vacuum pump system consists of three or more pumps, in which case the backup or lag signal is permitted to energize when the last pump has been signaled to start

(5) When a central dedicated WAGD producer is provided per 5.1.3.8.1.3, WAGD lag in use with the signal to be manually reset

(6) Instrument air dew point high, to indicate when the line pressure dew point is greater than ~~-30°C (-22°F)~~

(7) For compressor systems using liquid ring compressors or compressors with water-cooled components, high water in the receiver tank, to indicate when the water level in the receiver tank, has reached a level determined to be detrimental to the operation of the system

(8) For compressor systems using liquid ring compressors, high water in the separators

(9) For compressor systems using other than liquid ring compressors, high discharge air temperature

(10) Proportioning systems high/low indicator when the oxygen concentration is outside 19.5 percent to 23.5 percent oxygen

(11) Proportion systems reserve system in operation

Statement of Problem and Substantiation for Public Input

This is a placeholder for the Task Group #1 discussion.

Submitter Information Verification

Submitter Full Name: JONATHAN WILLARD
Organization: ACUTE MEDICAL GAS SERVICES
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 13:05:17 EDT 2015

Committee Statement

Resolution: The committee is open to receiving more research and analysis of dew point requirements. The discussion in the meeting resolved that there is not a clinical concern at any of the possible levels since for clinical applications, the air is needed to be humidifies regardless. The analysis should review what dew point levels can result in water in a pipeline or water causing mechanical damage.

Public Input No. 268-NFPA 99-2015 [Section No. 5.1.10.1.4]

5.1.10.1.4*

Tubes shall be one of the following:

(1) hard-drawn seamless copper in accordance with ASTM B 819, *Standard Specification for Seamless Copper Tube for Medical Gas Systems*, medical gas tube, Type L, except Type K shall be used where operating pressures are above a gauge pressure of 1275 kPa (185 psi) and the pipe sizes are larger than DN80 [NPS 3 (3 ⅛ in. O.D.)].

(2) Listed corrugated stainless steel medical gas tubing constructed of 300 series stainless steel with a design margin of 3.5, coated with a non-metallic sheath and marked with the manufacturer's marking using the colors specified in Table 5.1.11.

Additional Proposed Changes

File Name	Description	Approved
Hoffmann_Feige_Final_Ltr_Report_Aug_2014.pdf	Hoffmann & Feige report on tubing design margin referenced in the substantiation.	

Statement of Problem and Substantiation for Public Input

Corrugated Stainless Steel Medical Tubing (CSMT) provides enhanced safety through fewer joints, reducing the possibility of leaks, less hot work at installation, and utilizes proven materials and techniques currently employed in similar industries. Additionally, CSMT, being semi-flexible is inherently seismic resistant, the product will move and flex during a seismic event, unlike rigid tubing which is prone to rupture during such event. Health care facility owners will benefit from reduced installation time since long lengths will be supplied thereby eliminating joints, less permitting, and can accommodate renovations easily. Contractors will benefit from a simpler installation, due to color coded CSMT, there is less chance for cross connection, and there is less possibility for contamination.

Section 5.1.10 is revised to add a new medical gas piping material, Corrugated Stainless Steel Medical Tubing (CSMT) which will be installed using nonseparable stainless steel fittings. The tubing has a 300 series stainless steel tube coated with a plastic sheath which is printed with the necessary information. The tubing and fittings must be listed. A test program has been developed to show the durability of this new tubing system with respect to the mechanical, thermal, and sealing integrity required for this application as part of a Fact Finding Investigation. (Currently, CSMT cannot be listed as NFPA 99 allows only copper tubing to be used.) UL conducts fact finding investigations on products that cannot be listed to determine if the product could be listed if the code is revised.

Fact-Finding Investigations are undertaken by UL to develop facts and issue a Report for use by the Applicant in seeking amendments in nationally recognized installation codes and standards. The issuance of the Fact Finding Report does not constitute an endorsement of any proposed amendment and in no way implies Listing, Classification or other recognition by UL and does not authorize the use of UL Listing or Classification Marks or any other reference to Underwriters Laboratories Inc. on, or in connection with, the product.

Underwriters Laboratories Inc., its employees, and its agents shall not be responsible to anyone for the use or nonuse of the information contained in this Report, and shall not incur any obligation or liability for damages, including consequential damages, arising out of or in connection with the use of, or inability to use, the information contained in this Report.

This Fact-Finding Report covers the investigation of medical gas tubing with end fittings.

The purpose of this investigation was to develop data to be used by the submitter, OmegaFlex Inc., to support their proposal to amend NFPA 99. Since the current Edition of the NFPA 99 does not permit medical gas tubing to be installed, this investigation has been undertaken on a fact-finding basis and this report is therefore not provided with any conclusions.

The Fact Finding Investigation that is being used by UL for medical gas tubing includes the following tests:

1. Leakage Test
2. Hydrostatic Strength
3. Impact
4. Axial Tension
5. Torsion
6. Elevated Temperature
7. Flame
8. Compression
9. Bending
10. Effectiveness of Striker Plates
11. Electrical Resistance
12. Resistance to Installation Damage
13. Jacket Burning Characteristics
14. Mechanical Fitting Performance
15. Mechanical Fittings Resistance to Removal or Re-Assembly

The test program that is being used by UL for the Fact Finding Investigation is attached.

Testing at UL is underway and the Fact Finding Report will be available when all testing is completed.

CSMT is manufactured specifically for medical gas and vacuum service and meets the pressure requirements of NFPA 99 for medical gas service. The tubing is an inherently clean product because it is manufactured in a continuous process from a flat stainless steel sheet which is rolled to the tube shape and continuously welded with an inert gas purge. The convolutions are then formed and the jacket is applied. It is manufactured using no solvents or oils. The water based lubricant used does not come into contact with the interior of the tubing during the manufacturing process. Tubing is sealed after cutting, and shipped in coils of varying length with seals at each end to prevent contamination. After cutting off a section of tubing, the seal can be relocated to the remaining length of unused tubing.

It is proposed that CSMT have a design margin (sometimes called safety factor) of 3.5. The design margin is the ratio of the burst pressure to the maximum operating pressure of tubing. A study was conducted by Mr. Richard Hoffmann, PE on the appropriate design margin for CSMT. Mr. Hoffmann notes that the design margin for pipe and tubing under ASME B31.3, Process Piping is 3.0. B31.3 applies to process piping used in the chemical and petroleum industries. The study is attached.

The fittings will be cleaned and shipped in individual sealed packaging. No special tools are required to assemble the fittings. Fittings are attached to the tubing by removing a short length of the non-metallic jacket, inserting the tubing into the fitting, and tightening the fitting. The fitting is then tightened with a wrench to the required torque. After assembly, the fitting cannot be removed without destroying it or rendering it unusable.

CSMT has been in use in a number of hospitals in Europe in oxygen service for 6 years with no problems.

At the time this proposal is submitted there is one manufacturer of CSMT. Other manufactures make a similar product for fuel gas service, and it is possible that they may also produce CSMT. There are no patent restrictions on other manufacturers developing similar products. The similar product used for fuel gases are manufactured by a multiple companies.

Submitter Information Verification

Submitter Full Name: [Not Specified]
Organization: Theodore Lemoff
Affilliation: Omega Flex
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jun 29 13:03:20 EDT 2015

Committee Statement

Resolution: FR-654-NFPA 99-2015. This tubing is being limited to use in systems other than medical air systems which produce on site. There are concerns with how water accumulation will be affected by corrugations in the piping and also with how the stainless steel will react where subject to water accumulation in the tubing.

Statement: This revision permits an additional material for medical gas tubing. This will need a listing to be used as written. There are several other revisions related to the use of this new material. It is understood that a listing for this purpose will include Leakage Test, Hydrostatic Strength, Impact, Axial Tension, Torsion, Elevated Temperature, Flame, Compression, Bending, Effectiveness of Striker Plates, Electrical Resistance, Resistance to Installation Damage, Jacket Burning Characteristics, Mechanical Fitting Performance, Mechanical Fittings Resistance to Removal or Re-Assembly.

This tubing is being limited to use in systems other than medical air systems which produce the air on site. There are concerns with how water accumulation will be affected by corrugations in the piping and also with how the stainless steel will react where subject to water accumulation in the tubing.

Public Input No. 269-NFPA 99-2015 [Section No. 5.1.10.1.4]

5.1.10.1.4*

Tubes shall be one of the following:

(1) hard-drawn seamless copper in accordance with ASTM B 819, *Standard Specification for Seamless Copper Tube for Medical Gas Systems*, medical gas tube, Type L, except Type K shall be used where operating pressures are above a gauge pressure of 1275 kPa (185 psi) and the pipe sizes are larger than DN80 [NPS 3 (3 ⅛ in. O.D.)].

(2) Listed corrugated stainless steel medical gas tubing constructed of 300 series stainless steel with a design margin of 3.5, coated with a non-metallic sheath and marked with the manufacturer's marking using the colors specified in Table 5.1.11.

Additional Proposed Changes

File Name	Description	Approved
Hoffmann_Feige_Final_Ltr_Report_Aug_2014.pdf	Hoffmann & Feige tubing design margin report cited in substantiation.	
MediTrac_Physical_Test_Criteria_US_Rev_6-22-15.docx		

Statement of Problem and Substantiation for Public Input

Corrugated Stainless Steel Medical Tubing (CSMT) provides enhanced safety through fewer joints, reducing the possibility of leaks, less hot work at installation, and utilizes proven materials and techniques currently employed in similar industries. Additionally, CSMT, being semi-flexible is inherently seismic resistant, the product will move and flex during a seismic event, unlike rigid tubing which is prone to rupture during such event. Health care facility owners will benefit from reduced installation time since long lengths will be supplied thereby eliminating joints, less permitting, and can accommodate renovations easily. Contractors will benefit from a simpler installation, due to color coded CSMT, there is less chance for cross connection, and there is less possibility for contamination.

Section 5.1.10 is revised to add a new medical gas piping material, Corrugated Stainless Steel Medical Tubing (CSMT) which will be installed using nonseparable stainless steel fittings. The tubing has a 300 series stainless steel tube coated with a plastic sheath which is printed with the necessary information. The tubing and fittings must be listed. A test program has been developed to show the durability of this new tubing system with respect to the mechanical, thermal, and sealing integrity required for this application as part of a Fact Finding Investigation. (Currently, CSMT cannot be listed as NFPA 99 allows only copper tubing to be used.) UL conducts fact finding investigations on products that cannot be listed to determine if the product could be listed if the code is revised.

Fact-Finding Investigations are undertaken by UL to develop facts and issue a Report for use by the Applicant in seeking amendments in nationally recognized installation codes and standards. The issuance of the Fact Finding Report does not constitute an endorsement of any proposed amendment and in no way implies Listing, Classification or other recognition by UL and does not authorize the use of UL Listing or Classification Marks or any other reference to Underwriters Laboratories Inc. on, or in connection with, the product.

Underwriters Laboratories Inc., its employees, and its agents shall not be responsible to anyone for the use or nonuse of the information contained in this Report, and shall not incur any obligation or liability for damages, including consequential damages, arising out of or in connection with the use of, or inability to use, the information contained in this Report.

This Fact-Finding Report covers the investigation of medical gas tubing with end fittings.

The purpose of this investigation was to develop data to be used by the submitter, OmegaFlex Inc., to support their proposal to amend NFPA 99. Since the current Edition of the NFPA 99 does not permit medical gas tubing to be installed, this investigation has been undertaken on a fact-finding basis and this report is therefore not provided with any conclusions.

The Fact Finding Investigation that is being used by UL for medical gas tubing includes the following tests:

1. Leakage Test
2. Hydrostatic Strength
3. Impact
4. Axial Tension
5. Torsion

6. Elevated Temperature
7. Flame
8. Compression
9. Bending
10. Effectiveness of Striker Plates
11. Electrical Resistance
12. Resistance to Installation Damage
13. Jacket Burning Characteristics
14. Mechanical Fitting Performance
15. Mechanical Fittings Resistance to Removal or Re-Assembly

The test program that is being used by UL for the Fact Finding Investigation is attached.

Testing at UL is underway and the Fact Finding Report will be available when all testing is completed.

CSMT is manufactured specifically for medical gas and vacuum service and meets the pressure requirements of NFPA 99 for medical gas service. The tubing is an inherently clean product because it is manufactured in a continuous process from a flat stainless steel sheet which is rolled to the tube shape and continuously welded with an inert gas purge. The convolutions are then formed and the jacket is applied. It is manufactured using no solvents or oils. The water based lubricant used does not come into contact with the interior of the tubing during the manufacturing process. Tubing is sealed after cutting, and shipped in coils of varying length with seals at each end to prevent contamination. After cutting off a section of tubing, the seal can be relocated to the remaining length of unused tubing.

It is proposed that CSMT have a design margin (sometimes called safety factor) of 3.5. The design margin is the ratio of the burst pressure to the maximum operating pressure of tubing. A study was conducted by Mr. Richard Hoffmann, PE on the appropriate design margin for CSMT. Mr. Hoffmann notes that the design margin for pipe and tubing under ASME B31.3, Process Piping is 3.0. B31.3 applies to process piping used in the chemical and petroleum industries. The study is attached.

The fittings will be cleaned and shipped in individual sealed packaging. No special tools are required to assemble the fittings. Fittings are attached to the tubing by removing a short length of the non-metallic jacket, inserting the tubing into the fitting, and tightening the fitting. The fitting is then tightened with a wrench to the required torque. After assembly, the fitting cannot be removed without destroying it or rendering it unusable.

CSMT has been in use in a number of hospitals in Europe in oxygen service for 6 years with no problems.

At the time this proposal is submitted there is one manufacturer of CSMT. Other manufactures make a similar product for fuel gas service, and it is possible that they may also produce CSMT. There are no patent restrictions on other manufacturers developing similar products. The similar product used for fuel gases are manufactured by a multiple companies.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 249-NFPA 99-2015 [New Section after 3.3.116]	
Public Input No. 270-NFPA 99-2015 [New Section after 5.1.10.1.5]	
Public Input No. 271-NFPA 99-2015 [Section No. 5.1.10.3.1]	
Public Input No. 272-NFPA 99-2015 [New Section after 5.1.10.3.1]	
Public Input No. 273-NFPA 99-2015 [New Section after 5.1.10.8]	
Public Input No. 275-NFPA 99-2015 [Section No. 5.1.11.1.1]	

Submitter Information Verification

Submitter Full Name: THEODORE LEMOFF

Organization: TLemoff Engineering
Affilliation: Omega Flex
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jun 29 13:24:05 EDT 2015

Committee Statement

Resolution: FR-654-NFPA 99-2015. This tubing is being limited to use in systems other than medical air systems which produce on site. There are concerns with how water accumulation will be affected by corrugations in the piping and also with how the stainless steel will react where subject to water accumulation in the tubing.

Statement: This revision permits an additional material for medical gas tubing. This will need a listing to be used as written. There are several other revisions related to the use of this new material. It is understood that a listing for this purpose will include Leakage Test, Hydrostatic Strength, Impact, Axial Tension, Torsion, Elevated Temperature, Flame, Compression, Bending, Effectiveness of Striker Plates, Electrical Resistance, Resistance to Installation Damage, Jacket Burning Characteristics, Mechanical Fitting Performance, Mechanical Fittings Resistance to Removal or Re-Assembly.

This tubing is being limited to use in systems other than medical air systems which produce the air on site. There are concerns with how water accumulation will be affected by corrugations in the piping and also with how the stainless steel will react where subject to water accumulation in the tubing.

Public Input No. 270-NFPA 99-2015 [New Section after 5.1.10.1.5]

TITLE OF NEW CONTENT

5.1.10.1.5 Corrugated stainless steel medical tubing jacket shall have a flame spread index of 25 or less, and smoke density rating of 50 or less as determined by the Test Method for Surface Burning Characteristics of Building Materials, ASTM E84.

Statement of Problem and Substantiation for Public Input

A new 5.1.10.1.5 is added to provide a minimum flame spread index and smoke developed index for the plastic jacket of the CSSMT using ASTM E84, which is widely used for these measurements. The values are identical to those used for Corrugated Stainless Steel Tubing used for fuel gas service. These values are compliant with the flame and smoke indices for Class A interior finishes in NFPA 101, Life Safety Code®. Class A is the most stringent class of interior finish materials in the Life Safety Code®

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 249-NFPA 99-2015 [New Section after 3.3.116]	
Public Input No. 269-NFPA 99-2015 [Section No. 5.1.10.1.4]	
Public Input No. 271-NFPA 99-2015 [Section No. 5.1.10.3.1]	
Public Input No. 272-NFPA 99-2015 [New Section after 5.1.10.3.1]	
Public Input No. 273-NFPA 99-2015 [New Section after 5.1.10.8]	
Public Input No. 275-NFPA 99-2015 [Section No. 5.1.11.1.1]	

Submitter Information Verification

Submitter Full Name: THEODORE LEMOFF
Organization: TLemoff Engineering
Affilliation: Omega Flex
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jun 29 13:51:54 EDT 2015

Committee Statement

Resolution: FR-655-NFPA 99-2015

Statement: This new section is added to provide a minimum flame spread index and smoke developed index for the plastic jacket of the CSMT using ASTM E84, which is widely used for these measurements. The values are identical to those used for Corrugated Stainless Steel Tubing used for fuel gas service. These values are compliant with the flame and smoke indices for Class A interior finishes in NFPA 101, Life Safety Code®. Class A is the most stringent class of interior finish materials in the Life Safety Code®

Public Input No. 34-NFPA 99-2015 [New Section after 5.1.10.1.6]

5.1.10.1.7

5.1.10.1.7 Witnessing of Installer Performed Test. Witnessing of installer performed test shall be witnessed by the Registered Design Professional in Responsible Charge (RDPRC), authority having jurisdiction or their designee and signed off by both the installing contractor, RDPRC and the AHJ or their designee before proceeding to the next test procedure. The RDPRC, authority having jurisdiction or their designee shall be certified in medical gas inspections per the ASSE 6020 standards (including Annex B), and follow the standards outlined in this code.

Statement of Problem and Substantiation for Public Input

clarification of who can witness the particular test

Submitter Information Verification

Submitter Full Name: John Gregory
Organization: HDR Architecture Inc.
Affilliation: PIPE Medical Gas Committee Phoenix, AZ
Street Address:
City:
State:
Zip:
Submittal Date: Wed Apr 08 12:58:54 EDT 2015

Committee Statement

Resolution: FR-631-NFPA 99-2015

Statement: This revision will require that the concealed piping distribution system and associated components are inspected prior to being concealed. This will eliminate systems being installed that are not properly labeled or pressure tested. And eliminate system failures during the verification phase. This is being required by some states already and precedence has been established for this requirement.

Public Input No. 332-NFPA 99-2015 [Section No. 5.1.10.2.2.2]

5.1.10.2.2.2

If medical gas tube in accordance with ASTM B 819, *Standard Specification for Seamless Copper Tube for Medical Gas Systems,* is used for vacuum piping ~~,~~ such special marking shall not be required~~, provided that the vacuum piping installation meets all other requirements for medical gas piping, including the prohibition of flux on copper-to-copper joints and the use of a nitrogen purge while brazing~~ .

Statement of Problem and Substantiation for Public Input

Clarification - all brazed joints require nitrogen purge per 5.1.10.4.1.10 regardless tube type

Submitter Information Verification

Submitter Full Name: Anthony Lowe
Organization: Allied Hospital Systems
Street Address:
City:
State:
Zip:
Submittal Date: Fri Jul 03 11:28:29 EDT 2015

Committee Statement

Resolution: FR-632-NFPA 99-2015
Statement: This revision is a simplification of the code text. All brazed joints require nitrogen purge per 5.1.10.4.1.10 regardless tube type. The information deleted was unnecessary.

Public Input No. 272-NFPA 99-2015 [New Section after 5.1.10.3.1]

TITLE OF NEW CONTEN

Add a new 5.1.10.3.2 to reas:

5.1.10.3.2. Positive pressure patient gas systems, medical support gas systems, vacuum systems, and WAGD systems fabricated from listed Corrugated Stainless Steel Medical tubing shall have all turns, offsets, and other changes in direction made by bending the tubing up to its minimum bend radius or with listed Corrugated Stainless Steel Medical tubing fittings in accordance with 5.1.10.9.

Statement of Problem and Substantiation for Public Input

A new paragraph 5.1.10.3.2 is proposed to recognize CSMT fitting and to reference their installation requirements.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 249-NFPA 99-2015 [New Section after 3.3.116]	
Public Input No. 269-NFPA 99-2015 [Section No. 5.1.10.1.4]	
Public Input No. 270-NFPA 99-2015 [New Section after 5.1.10.1.5]	
Public Input No. 271-NFPA 99-2015 [Section No. 5.1.10.3.1]	
Public Input No. 273-NFPA 99-2015 [New Section after 5.1.10.8]	
Public Input No. 275-NFPA 99-2015 [Section No. 5.1.11.1.1]	

Submitter Information Verification

Submitter Full Name: THEODORE LEMOFF
Organization: TLemoff Egineering
Affilliation: Omega Flex
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jun 29 14:07:22 EDT 2015

Committee Statement

Resolution: FR-657-NFPA 99-2015
Statement: A new paragraph 5.1.10.3.2 is proposed to recognize CSMT fitting and to reference their installation requirements.

Public Input No. 271-NFPA 99-2015 [Section No. 5.1.10.3.1]

5.1.10.3.1*

Positive pressure patient gas systems, medical support gas systems, vacuum systems, and WAGD systems fabricated from other than Corrugated Stainless Steel Medical tubing shall have all turns, offsets, and other changes in direction made using fittings or techniques appropriate to any of the following acceptable joining methods:

(1) Brazing, as described in 5.1.10.4

(2) Welding, as described in 5.1.10.5

(3) Memory metal fittings, as described in 5.1.10.6

(4) Axially swaged, elastic preload fittings, as described in 5.1.10.7

(5) Threaded, as described under 5.1.10.8

Statement of Problem and Substantiation for Public Input

Paragraph 5.1.10.3.1 is revised to limit the current joining methods to piping materials other than CSMT, as the joining methods are not appropriate for CSMT.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 249-NFPA 99-2015 [New Section after 3.3.116]	
Public Input No. 269-NFPA 99-2015 [Section No. 5.1.10.1.4]	
Public Input No. 270-NFPA 99-2015 [New Section after 5.1.10.1.5]	
Public Input No. 272-NFPA 99-2015 [New Section after 5.1.10.3.1]	
Public Input No. 273-NFPA 99-2015 [New Section after 5.1.10.8]	
Public Input No. 275-NFPA 99-2015 [Section No. 5.1.11.1.1]	

Submitter Information Verification

Submitter Full Name: THEODORE LEMOFF
Organization: TLemoff Engineering
Affiliation: Omega Flex
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jun 29 14:04:54 EDT 2015

Committee Statement

Resolution:
Statement: This section has been revised to limit the current joining methods to piping materials other than CSMT, as the joining methods are not appropriate for CSMT.

Public Input No. 66-NFPA 99-2015 [Section No. 5.1.10.4.1.10]

5.1.10.4.1.10

~~Braze~~ Positive pressure braze joints shall be continuously purged with nitrogen NF.

Statement of Problem and Substantiation for Public Input

to comply with 5.1.10.2.2.1 to clarify that vacuum tube does not have to be purged with nitrogen NF if labeled.

Submitter Information Verification

Submitter Full Name: John Gregory
Organization: HDR Architecture Inc.
Affilliation: P.I.P.E. Medical Gas Committee Phoenix AZ
Street Address:
City:
State:
Zip:
Submittal Date: Wed Apr 15 14:37:22 EDT 2015

Committee Statement

Resolution: The nitrogen purge should be applied to both vacuum and positive pressure gas systems. The substantiation did not provide technical support for removing this requirement for vacuum systems.

Public Input No. 167-NFPA 99-2015 [Section No. 5.1.10.4.2.3]

5.1.10.4.2.3

The cut ends of the tube shall be ***[DELETE*** ***permitted to be]*** rolled smooth or deburred with a sharp, clean deburring tool, taking care to prevent chips from entering the tube.

Statement of Problem and Substantiation for Public Input

The verbiage "shall be permitted to be" is difficult for the 6010 Installer to definitively understand and act on. An Instructor stated that the way this paragraph is written, it could be read as no preparation of the tube end other than cleaning is required OR the tube end shall be either deburred or rolled smooth. Either delete the "permitted to be" or state that no tube prep other than cleaning is required.

Submitter Information Verification

Submitter Full Name: HANS DALKE
Organization: PLUMBERS LOCAL UNION 27
Affilliation: Medical Gas Instructor Plumbers Local Union #27
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 03 20:28:56 EDT 2015

Committee Statement

Resolution: Not all cut tube ends need to be rolled smooth or deburred. The current terminology allows for the permission to do so, but does not require clean cuts to be rolled smooth or deburred.

Public Input No. 168-NFPA 99-2015 [Section No. 5.1.10.4.3.4]

5.1.10.4.3.4

If the interior surfaces of fitting sockets become contaminated prior to brazing, they shall be recleaned for oxygen in accordance with 5.1.10.4.3.10 and be cleaned for brazing with a clean, oil-free ***[non-ferrous]*** wire brush.

Statement of Problem and Substantiation for Public Input

I'm not sure if stainless steel or brass wire brushes are required as opposed to steel. Degreasing a steel wire brush may cause it to rust. If this is a non issue, please delete the change.

Submitter Information Verification

Submitter Full Name: HANS DALKE
Organization: PLUMBERS LOCAL UNION 27
Affilliation: Medical Gas Instructor Plumbers Local Union #27
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 03 20:40:45 EDT 2015

Committee Statement

Resolution: FR-633-NFPA 99-2015
Statement: Degreasing a steel wire brush may cause it to rust. The pecification of stainless steel or brass should help prevent this issue.

Public Input No. 169-NFPA 99-2015 [Section No. 5.1.10.4.3.10]

5.1.10.4.3.10

The interior surfaces of ***[DELETE _ tube ends ,-]*** fittings, and other components that were cleaned for oxygen service by the manufacturer, but that became contaminated prior to being installed, shall be permitted to be recleaned on-site by the installer by thoroughly scrubbing the interior surfaces with a clean, hot water–alkaline solution, such as sodium carbonate or trisodium phosphate, using a solution of 450 g (1 lb) of sodium carbonate or trisodium phosphate to 11 L (3 gal) of potable water, and thoroughly rinsing them with clean, hot, potable water.

Statement of Problem and Substantiation for Public Input

The allowance to clean the interior surfaces of tube ends can be problematic in 2 ways. There is no stated limit on how far into a tube it can be recleaned. In addition, allowing the cleaning agent into the tube could make it difficult to remove, thereby contaminating the pipe. The tube should either be used for another service or the contaminated portion should be cut off.

Submitter Information Verification

Submitter Full Name: HANS DALKE
Organization: PLUMBERS LOCAL UNION 27
Affilliation: Medical Gas Instructor Plumbers Local Union #27
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 03 20:50:12 EDT 2015

Committee Statement

Resolution: It is important to retain the requirement that the interior of tube ends be cleaned, since plugs will often leave residue that needs to be removed by cleaning prior to installation.

Public Input No. 170-NFPA 99-2015 [Section No. 5.1.10.4.3.13]

5.1.10.4.3.13

Joints shall be brazed within ~~8~~ ***[24]*** hours after the surfaces are cleaned for brazing.

Statement of Problem and Substantiation for Public Input

The 8 hour limit to braze after assembly is sometimes difficult to comply with and results in lost time trying to gauge how much to assemble and what time frame is needed to complete the brazing. Assembled sections have to be brazed before days end. This is complicated by hot work permits sometimes disallowing soldering, brazing, welding, cutting, and / or grinding operations and hour or better before days end. Increasing the time to 24 hours allows brazing as much as possible during a shift, allowing for cool down time with a fire watch and assembling additional pipe for the next day's brazement.

Submitter Information Verification

Submitter Full Name: HANS DALKE
Organization: PLUMBERS LOCAL UNION 27
Affilliation: Medical Gas Instructor Plumbers Local Union #27
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 03 20:58:17 EDT 2015

Committee Statement

Resolution: The 8 hour window is adequate time to require brazing. This ensures that the brazing is done within one shift of cleaning.

Public Input No. 67-NFPA 99-2015 [Section No. 5.1.10.4.5.1]

5.1.10.4.5.1

When brazing, positive pressure joints shall be continuously purged with oil-free, dry nitrogen NF to prevent the formation of copper oxide on the inside surfaces of the joint.

Statement of Problem and Substantiation for Public Input

to comply with 5.1.10.2.2.1 to clarify that vacuum tube does not have to be purged with nitrogen NF if labeled prior to being installed

Submitter Information Verification

Submitter Full Name: John Gregory
Organization: HDR Architecture Inc.
Affilliation: P.I.P.E. Medical Gas Committee Phoenix AZ
Street Address:
City:
State:
Zip:
Submittal Date: Wed Apr 15 14:42:23 EDT 2015

Committee Statement

Resolution: Resolve based on previous action [Hart to find substantatioation]

Public Input No. 273-NFPA 99-2015 [New Section after 5.1.10.8]

TITLE OF NEW CONTENT

Add a new 5.1.10.9 to read:

5.1.10.9 Corrugated stainless steel medical tubing fittings .

5.1.10.9.1 Corrugated stainless steel medical tubing fittings shall meet the following requirements:

(1) They shall be listed

(2) They shall be constructed of a metal with a melting point of melting point of at least 538°C (1000°F) which will not corrode in the installed environment.

(3) They shall be installed by technicians qualified in accordance with the manufacturer's instructions.

(3) They shall have a pressure rating equal to or greater than the pressure rating of the medical tubing and other piping they connect.

(4) When connection is made, the fitting shall provide a permanent and nonseparable joint.

5.1.10.9.2 Cutting Corrugated Stainless Steel Medical Tube Ends.

5.1.10.9.2.1 Tube ends shall be cut square using a sharp tubing cutter to avoid deforming the tube.

5.1.10.9.2.2 The cutting wheels on tubing cutters shall be free from grease, oil, or other lubricant not suitable for oxygen service.

5.1.10.9.2.3 The cut ends of the tube shall be permitted to be rolled smooth or deburred with a sharp, clean deburring tool, taking care to prevent chips from entering the tube.

5.1.10.9.3 Cleaning Corrugated Stainless Steel Joints.

5.1.10.9.3.1 The interior surfaces of tubes, fittings, and other components that are cleaned for oxygen service shall be stored and handled to avoid contamination prior to assembly and brazing.

5.1.10.9.3.2. The exterior surfaces of tube ends shall be cleaned prior to brazing to remove any surface oxides. If the interior surfaces of fitting sockets become contaminated prior to assembly, they shall be recleaned for oxygen in accordance with 5.1.10.4.3.10 and be cleaned with a clean, oil-free wire brush.

5.1.10.9.3.3 When cleaning the exterior surfaces of tube ends, no matter shall be allowed to enter the tube.

5.1.10.9.3.4 If the interior surfaces of fitting sockets become contaminated prior to brazing assembly, they shall be recleaned for oxygen in accordance with 5.1.10.4.3.10 and be cleaned for brazing with a clean, oil-free wire brush.

5.1.10.9.3.5 Clean, nonshedding, abrasive pads shall be used to clean the exterior surfaces of the tube ends.

5.1.10.9.3.6 The use of steel wool or sand cloth shall be prohibited.

5.1.10.9.3.7 The cleaning process shall not result in grooving of the surfaces to be joined.

5.1.10.9.3.8 After being abraded, the surfaces shall be wiped using a clean, lint-free white cloth.

5.1.10.4.3.9 Tubes, fittings, valves, and other components shall be visually examined internally before being joined to verify that they have not become contaminated for oxygen service and that they are free of obstructions or debris.

5.1.10 . 9.3.10 The interior surfaces of tube ends, fittings, and other components that were cleaned for oxygen service by the manufacturer, but that became contaminated prior to being installed, shall be permitted to be recleaned on-site by the installer by thoroughly scrubbing the interior surfaces with a clean, hot water–alkaline solution, such as sodium carbonate or trisodium phosphate, using a solution of 450 g (1 lb) of sodium carbonate or trisodium phosphate to 11 L (3 gal) of potable water, and thoroughly rinsing them with clean, hot, potable water.

5.1.1 0.9.3.11 Other aqueous cleaning solutions shall be permitted to be used for on-site recleaning permitted in 5.1.10.4.3.10, provided that they are as recommended in CGA G-4.1, *Cleaning Equipment for Oxygen Service* , and are listed in CGA O2-DIR, *Directory of Cleaning Agents for Oxygen Service* .

5.1.10.9.3.12 Material that has become contaminated internally and is not clean for oxygen service shall not be installed.

5.1.10.9.3.13 Joints shall be assembled within 8 hours after the surfaces are cleaned.

Statement of Problem and Substantiation for Public Input

A new section 5.1.10.9 is proposed to provide the requirements for CSMT fittings and installation requirements.

- Fitting requirements include listing, material specification of a minimum melting point which allows brass and stainless steel - but not aluminum and zinc alloys, and to require a material that will not corrode in the installed condition in health care facilities, installation by trained personnel, minimum pressure rating, and that the joints, when assembled are permanent and nonseparable, as brazed joints are. These requirements provided a high level of corrosion resistance and integrity for the fittings, their installation, and long service life.
- The proposed requirements for cutting CSMT are identical to 5.1.10.4.2 for copper tubing.
- The cleaning requirements are taken from 5.1.10.4.3 for cleaning joints before brazing with modifications that recognize the fittings used with CSMT.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 249-NFPA 99-2015 [New Section after 3.3.116]	
Public Input No. 269-NFPA 99-2015 [Section No. 5.1.10.1.4]	
Public Input No. 270-NFPA 99-2015 [New Section after 5.1.10.1.5]	
Public Input No. 271-NFPA 99-2015 [Section No. 5.1.10.3.1]	
Public Input No. 272-NFPA 99-2015 [New Section after 5.1.10.3.1]	
Public Input No. 275-NFPA 99-2015 [Section No. 5.1.11.1.1]	

Submitter Information Verification

Submitter Full Name: THEODORE LEMOFF
Organization: TLemoff Engineering
Affilliation: Omega Flex
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jun 29 14:11:55 EDT 2015

Committee Statement

Resolution: While sections on these topics are important to include for the new use of CSMT, there are numerous issues with the language as proposed. As written, this would allow for steel to copper brazing which is not currently addressed within NFPA 99. The committee is open to introducing the concept of copper to steel brazing, provided that appropriate procedures can be developed. This should consider the impact on brazer qualifications that currently are in place. Another solution may be to provide copper extensions, which might make the dissimilar metal brazing discussion moot.

Public Input No. 171-NFPA 99-2015 [Section No. 5.1.10.10]

5.1.10.10 Prohibited Joints.

The following joints shall be prohibited throughout medical gas and vacuum distribution pipeline systems:

(1) Flared and compression-type connections, including connections to station outlets and inlets, alarm devices, and other components

(2) Other straight-threaded connections, including unions

(3) Pipe-crimping tools used to permanently stop the flow of medical gas and vacuum piping

(4) Removable and nonremovable push-fit fittings that employ a quick assembly push fit connector

(5) Victaulic style connections employing a roll groove and elastomeric / polymeric sealing ring

(6) Propress / pressfit style fittings even for temporary capping of medical gas lines.

Statement of Problem and Substantiation for Public Input

I have seen 6010 Installers use the propress style fitting to cap off lines temporarily. There is a lubricating film on the "O" ring that could allow lube back into the pipeline. As with other specifically forbidden connections, it can be readily seen as unacceptable if included in the section.
Victaulic style connections were proposed on Medical Air Intake piping (8" welded with rolled groove ends) on a job whereby I informed the company this was not in compliance. Clearly defining the disallowance of these style connections would eliminate any question.

Submitter Information Verification

Submitter Full Name: HANS DALKE
Organization: PLUMBERS LOCAL UNION 27
Affilliation: Medical Gas Instructor Plumbers Local Union #27
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 03 21:52:34 EDT 2015

Committee Statement

Resolution: The submitted language uses specific trade names. If the submitter wants to come back at the comment stage with more generic names for these types of joints the topic of prohibiting these joints will be considered by the committee.

Public Input No. 172-NFPA 99-2015 [Section No. 5.1.10.11.1.4]

5.1.10.11.1.4

Drops to individual station outlets and inlets shall be not less than DN15 (NPS ½) (⅝ in. O.D.) size ***with the reduction in size on WAGD and Medical Surgical Vacuum occurring on the vertical portion of pipe*** .

Statement of Problem and Substantiation for Public Input

Without clearly defining the location of the reduction in size to the vertical portion of piping in WAGD and Medical Surgical Vacuum, Installers could reduce directly off the main assuming any horizontal piping to be part of the "drop" unless of course, it is the intent of the code to allow any pipe of the branch to the drop to be this size. I believed the intent was to have Medical Surgical Vacuum and WAGD to run off a main as 3/4" and the reduction in vertical size as a space saver within the wall cavity.

Submitter Information Verification

Submitter Full Name: HANS DALKE
Organization: PLUMBERS LOCAL UNION 27
Affilliation: Medical Gas Instructor Plumbers Local Union #27
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 03 22:06:17 EDT 2015

Committee Statement

Resolution: Reductions in size for the drops to individual station outlets and inlets are already addressed with the current language. The additional language is not needed to clarify this requirement.

Public Input No. 25-NFPA 99-2015 [Section No. 5.1.10.11.3.2]

5.1.10.11.3.2

Piping shall not be installed in kitchens, stairwells, elevator shafts, elevator machine rooms, areas with open flames, electrical service equipment over 600 volts, and areas prohibited under *NFPA 70*, *National Electrical Code*, except for the following locations:

(1) Room locations for medical air compressor supply systems and medical–surgical vacuum pump supply systems

(2) Room locations for secondary distribution circuit panels and breakers having a maximum voltage rating of 600 volts

Statement of Problem and Substantiation for Public Input

Unprotected medical gas piping should not be located in exit egress stairwells. See NFPA 101, 2015; 7.1.3.2.1(10). I have seen this done in the past with all the gases serving the surgery suites.

Submitter Information Verification

Submitter Full Name: CORKY BISHOP
Organization: AIRGAS Inc.
Street Address:
City:
State:
Zip:
Submittal Date: Mon Mar 30 11:49:54 EDT 2015

Committee Statement

Resolution: FR-634-NFPA 99-2015

Statement: Unprotected medical gas piping should not be located in stairwells. See NFPA 101, 2015; 7.1.3.2.1(10). The committee has been advised of examples where been done in the past with all the gases serving the surgery suites. This revision should clearly prohibit this.

Public Input No. 173-NFPA 99-2015 [New Section after 5.1.10.11.4]

Unistrut racked piping

The use of unistrut style racks to accomodate multiple services shall use Hydrosorb style clamps to secure the piping to the rack regardless of unistrut finish. The use of tape or rubber sheeting is unacceptable. The painted surface of unistrut is, in itself, not an isolator between pipe and the steel unistrut.

Statement of Problem and Substantiation for Public Input

I have seen contractors instruct 6010 installers to simply put duct tape or shower pan liner between the copper clad strut clamp and the medical gas tubing as a cost saving procedure. When tightened, the pipe pushes through the tape or rubber, thereby losing any isolation quality.
In addition, another contractor informed his 6010 installer that painted unistrut instead of plated is adequate as an isolator.
Clearly defining the parameters of unistrut rack hangers will eliminate any question.

Submitter Information Verification

Submitter Full Name: HANS DALKE
Organization: PLUMBERS LOCAL UNION 27
Affilliation: Medical Gas Instructor Plumbers Local Union #27
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 03 22:21:02 EDT 2015

Committee Statement

Resolution: The proposed text uses a trade name. Even if the submitter comes back with similar language using generic names, the issue is already addressed in 5.1.10.11.4.2.

Public Input No. 174-NFPA 99-2015 [Section No. 5.1.10.11.6.3]

5.1.10.11.6.3

Metallic flexible joints shall be permitted in the pipeline where required for expansion joints, seismic protection, thermal expansion, or vibration control and shall be as follows:

(1) For all wetted surfaces, made of bronze, copper, or stainless steel

(2) Cleaned at the factory for oxygen service and received on the job site with certification of cleanliness

(3) Suitable for service at 2070 kPa (300 psig) or above and able to withstand temperatures of 538°C (1000°F) ***I'm not sure what to do with this. 5.1.10.11.6.2 indicates that metallic flexible CONNECTORS need to be rated for 1000 PSI and in this section, metallic flexible JOINTS need only be rated to 300 PSI . Confusing to students and should be more detailed in explanation.***

(4) Provided with brazing extensions to allow brazing into the pipeline per 5.1.10.4

(5) Supported with pipe hangers and supports as required for their additional weight

Statement of Problem and Substantiation for Public Input

The combination of both paragraphs 5.1.10.11.6.2 and 5.1.10.11.6.3 regarding flexible connectors or joints should be clarified as to what locations and configurations employ either. It is confusing to students as far as why there is a significant pressure difference rating on both. Clarification would help.

Submitter Information Verification

Submitter Full Name: HANS DALKE
Organization: PLUMBERS LOCAL UNION 27
Affilliation: Medical Gas Instructor Plumbers Local Union #27
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 03 22:38:32 EDT 2015

Committee Statement

Resolution: The submitter has not proposed any revision to the code language.

Public Input No. 37-NFPA 99-2015 [Section No. 5.1.10.11.7.1]

5.1.10.11.7.1

Two or more medical gas or vacuum piping systems shall not be interconnected for installation, testing, or any other reason~~, except as permitted by 5~~ . ~~1.10.11.7.2.~~

Statement of Problem and Substantiation for Public Input

We should never allow medical gas lines, including vacuum to ever be interconnected with an inline valve, period.

Submitter Information Verification

Submitter Full Name: John Gregory
Organization: HDR Architecture Inc.
Affilliation: P.I.P.E. Medical Gas Committee Phoenix AZ
Street Address:
City:
State:
Zip:
Submittal Date: Thu Apr 09 10:13:02 EDT 2015

Committee Statement

Resolution: Many facility's emergency preparedness procedures call for the interconnection of two systems of the same contents. It is not meant for this allowance to be applied to testing two different systems that have different contents. An annex note in the comment stage would be entertained to clarify this.

Public Input No. 36-NFPA 99-2015 [Section No. 5.1.10.11.7.2]

~~5.1.10.11.7.2~~ –

~~Medical gas and vacuum systems with the same contents shall be permitted to be interconnected with an in-line valve installed between the systems.~~

Statement of Problem and Substantiation for Public Input

We should never allow medical gas lines, including vacuum to ever be interconnected with an inline valve. To me this means we can pipe a medical air line to a vacuum line when doing an installation when both have a nitrogen purge (same contents). This section should be removed, we should never allow any system to be interconnected, this leaves the window open for a mishap to occur, when a contractor forgets to remove this interconnection and possibly gets past the verifier, as the inspector / AHJ will likely never see it as they do not inspect the med gas lines as you would like to think they do.

Submitter Information Verification

Submitter Full Name: John Gregory
Organization: HDR Architecture Inc.
Affilliation: P.I.P.E. Medical Gas Committee Phoenix AZ
Street Address:
City:
State:
Zip:
Submittal Date: Thu Apr 09 09:57:25 EDT 2015

Committee Statement

Resolution: Many facility's emergency preparedness procedures call for the interconnection of two systems of the same contents. It is not meant for this allowance to be applied to testing two different systems that have different contents. An annex note in the comment stage would be entertained to clarify this.

Public Input No. 294-NFPA 99-2015 [New Section after 5.1.10.11.11]

Braze Qualification test coupon

The test coupon shall be 1 1/2" type "L" or "K" copper tube.

The test coupon shall include 2 horizontal brazements in a fixed position and notched to indicate top of coupon and 2 vertical upfeed brazements.

The test coupon can include both sets of brazements (2 horizontal and 2 vertical upfeeds) on a single coupon (2 couplings and 3 pieces of tubing 4" long) or a set of 2 brazements on 2 separate coupons with 4" pieces of tubing.

___

Statement of Problem and Substantiation for Public Input

Outlining the size and makeup of the test coupon will prevent a testing agency from requiring multiple brazements of different sizes or size specific qualification tests since NFPA does not indicate the size of tube or brazement positions.

A single universal clearly defined test coupon outlined in size and brazement positions will prevent a testing agency from incurring substantial cost in stocking all sizes of tube and fittings for size specific certifications they deem necessary.

NFPA states in paragraph 1.2 that the purpose of the code is to establish minimum requirements for installations. Outlining the specific size and positions will prevent a testing agency from other excessive and costly requirements not addressed by NFPA 99.

The brazement process, as outlined, has served for the past 20 years that I recall and is adequate for ASME section IX brazers and should be clearly detailed.

Submitter Information Verification

Submitter Full Name: HANS DALKE
Organization: PLUMBERS LOCAL UNION 27
Affilliation: ASSE 6050 Medical Gas Instructor
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 30 21:40:27 EDT 2015

Committee Statement

Resolution: The qualification test procedures are already adequately identified in ASME and AWS standards an protocols. Including this information in NFPA 99 would require adding much more information than what is being proposed in this Public Input.

Public Input No. 282-NFPA 99-2015 [Section No. 5.1.10.11.11.4]

5.1.10.11.11.4

The brazing procedure qualification record and the record of brazer performance qualification shall document filler metal used, base metals, cleaning, joint clearance, overlap, internal purge gas and flow rate during brazing of coupon, and absence of internal oxidation in the completed coupon.

Statement of Problem and Substantiation for Public Input

The base metal is an essential variable and is critical to the brazing procedure.

Submitter Information Verification

Submitter Full Name: KAREN KOENIG
Organization: CGA
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 30 08:31:40 EDT 2015

Committee Statement

Resolution: FR-635-NFPA 99-2015
Statement: The base metal is an essential variable and is critical to the brazing procedure.

Public Input No. 275-NFPA 99-2015 [Section No. 5.1.11.1.1]

5.1.11.1.1

Piping shall be labeled by stenciling, printing, or adhesive markers that identify the patient medical gas, the support gas, or the vacuum system and include the following:

(1) Name of the gas or vacuum system or the chemical symbol per Table 5.1.11

(2) Gas or vacuum system color code per Table 5.1.11

(3) Where positive pressure gas piping systems operate at pressures other than the standard gauge pressure in Table 5.1.11, the operating pressure in addition to the name of the gas

Statement of Problem and Substantiation for Public Input

Paragraph 5.1.11.1, Pipe Labeling is revised to add printing as a method of labeling medical piping. As CSMT is product that will be manufactured for medical gas use only, it is logical to print the required information on the CSMT, as an alternate to field labeling.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 249-NFPA 99-2015 [New Section after 3.3.116]	
Public Input No. 269-NFPA 99-2015 [Section No. 5.1.10.1.4]	
Public Input No. 270-NFPA 99-2015 [New Section after 5.1.10.1.5]	
Public Input No. 271-NFPA 99-2015 [Section No. 5.1.10.3.1]	
Public Input No. 272-NFPA 99-2015 [New Section after 5.1.10.3.1]	
Public Input No. 273-NFPA 99-2015 [New Section after 5.1.10.8]	

Submitter Information Verification

Submitter Full Name: THEODORE LEMOFF
Organization: TLemoff Engineering
Affilliation: Omega Flex
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jun 29 14:17:52 EDT 2015

Committee Statement

Resolution: This section is meant to be a field-applied labeling rather than anything that comes from the manufacturer.

Public Input No. 234-NFPA 99-2015 [Section No. 5.1.11.2.7]

5.1.11.2.7 *

Zone valve box assemblies shall be labeled ~~outside of the valve box as to the areas that~~ with the specific rooms that they control as follows:

ZONE VALVES FOR THE (GAS/VACUUM NAME) SERVING (NAME ~~OF AREA~~ OF ROOMS SERVED BY THE PARTICULAR VALVE)

Statement of Problem and Substantiation for Public Input

Zone valves labeled "Emergency Department" are not specific enough when they actually control a dozen rooms in the department. A good example would be "Patient Rooms 201 thru 212 and 214 thru 220."

Labeling can be made visible from inside or outside the box when the cover has a clear area to view the labels. Labels should not be applied to the cover, as it can be lost or switched with another box.

Submitter Information Verification

Submitter Full Name: CORKY BISHOP
Organization: AIRGAS USA LLC
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 23 17:41:12 EDT 2015

Committee Statement

Resolution: FR-677-NFPA 99-2015
Statement: Zone valves labeled "Emergency Department" are not specific enough when they actually control a dozen rooms in the department. A good example would be "Patient Rooms 201 thru 212 and 214 thru 220."

Labeling can be made visible from inside or outside the box when the cover has a clear area to view the labels. Labels should not be applied to the cover, as it can be lost or switched with another box.

Public Input No. 426-NFPA 99-2015 [New Section after 5.1.11.4]

5.1.11.5 Source Equipment.

5.1.11.5.1 Source equipment shall be labeled or tagged to identify the patient medical gas, the support gas, or the vacuum system and include the following information:

(1) Name of the gas or vacuum system

(2) Gas or vacuum system color code

(3) Rooms, areas, or buildings served

(4) Emergency contact information for the department or individual responsible for maintaining the equipment

Statement of Problem and Substantiation for Public Input

We require many other components to be labeled with critical information. The source equipment should also be labeled with minimum information to allow for those responding to an issue to be able to under stand the potential impact on patient care as quickly as possible.

Submitter Information Verification

Submitter Full Name: JONATHAN WILLARD
Organization: ACUTE MEDICAL GAS SERVICES
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 12:42:13 EDT 2015

Committee Statement

Resolution: FR-636-NFPA 99-2015
Statement: Many other components are required to be labeled with critical information. The source equipment should also be labeled with minimum information to allow for those responding to an issue to be able to under stand the potential impact on patient care as quickly as possible.

Public Input No. 32-NFPA 99-2015 [Section No. 5.1.12.1]

5.1.12.1 ~~General~~ Enforcement .

5.1.12.1.1

Inspection and testing shall be performed on all new piped gas and vacuum systems, additions, renovations, temporary installations, or repaired systems to ensure, by a submitted documented process and procedure, that all applicable provisions of this document have been adhered to and system integrity has been achieved or maintained.

5.1.12.1.2

Inspection and testing shall include all components of the system, or portions thereof, including, but not limited to, gas bulk source(s); manifolds; compressed air source systems (e.g., compressors, dryers, filters, regulators); source alarms and monitoring safeguards; master alarms; pipelines; isolation valves; area alarms; zone valves; and station inlets (vacuum) and outlets (pressure gases).

5.1.12.1.3

All systems that are breached and components that are subject to additions, renovations, or replacement (e.g., new gas sources: bulk, manifolds, compressors, dryers, alarms) shall be inspected and tested.

5.1.12.1.4

Systems shall be deemed breached at the point of pipeline intrusion by physical separation or by system component removal, replacement, or addition.

5.1.12.1.5

Breached portions of the systems subject to inspection and testing shall be confined to only the specific altered zone and components in the immediate zone or area that is located upstream for vacuum systems and downstream for pressure gases at the point or area of intrusion.

5.1.12.1.6

The inspection and testing reports ~~shall be submitted~~ from the RDPRC, AHJ or their Designee shall be left behind after each visit and kept on site and accessible. If test were performed and witnessed by a certified third party, those reports and test results shall be submitted directly to the party that contracted for the testing, who shall submit the report or test results through channels to the responsible facility authority ~~and~~ , RDPRC, AHJ or thier Designee and any others that are required.

5.1.12.1.7

Reports shall contain detailed listings of all findings and results.

5.1.12.1.8

The responsible facility authority ~~shall~~ , registered design professional in responsible charge and the systems verifier shall review these inspection and testing records prior to the use of all systems to ensure that all findings and results of the inspection and testing have been successfully completed.

5.1.12.1.9

All documentation pertaining to inspections and testing shall be maintained on-site within the facility.

5.1.12.1.10

Before piping systems are initially put into use, the facility authority ~~shall~~ , and systems certified verifier shall be responsible for ascertaining that the gas/vacuum delivered at the outlet/inlet is that shown on the outlet/inlet label and that the proper connecting fittings are installed for the specific gas/vacuum service.

5.1.12.1.11

~~Acceptance of~~ The registered design professional in responsible charge, or their designee shall review the verifier's final report ~~shall be permitted~~ prior to ~~satisfy the requirements in~~ ~~5.1.12.1.10~~ . placing the systems into service.

5.1.12.1.12

The removal of components within a source system for repair and reinstallation, or the replacement of components like for like, shall be treated as new work for the purposes of testing whenever such work involves cutting or brazing new piping, or both.

5.1.12.1.12.1

Where no piping is changed, functional testing shall be performed as follows:

(1) To verify the function of the replaced device

(2) To ensure no other equipment in the system has been adversely impacted

5.1.12.1.12.2

Where no piping is changed, in addition to tests of general function required by 5.1.12.1.12.1, testing shall be performed as follows:

(1) Pressure gas sources shall be tested for compliance with 5.1.12.3.14.2 as applicable to the equipment type.

(2) Medical air and instrument air sources shall be tested to 5.1.12.3.14.3.

(3) Vacuum and WAGD systems shall be tested to 5.1.12.3.14.5.

(4) Alarm systems shall be tested to 5.1.12.3.5.2 and 5.1.12.3.5.3.

(5) All affected components shall be tested as appropriate to that specific component (e.g., a replaced dew point monitor would be tested to 5.1.3.6.3.13).

5.1.12.1.13

The rated accuracy of pressure and vacuum indicators used for testing shall be 1 percent (full scale) or better.

Statement of Problem and Substantiation for Public Input

Aligning with other NFPA codes with the Enforcement verbiage. We did edit it to be more inline with medical gas systems. This should better define who is who and who is responsible for what. We are trying to provide some direction when a city wants a registered design professional in responsible charge to be the AHJ or their Designee, this should help provide some direction and support.

Submitter Information Verification

Submitter Full Name: John Gregory
Organization: HDR Architecture Inc.
Affilliation: P.I.P.E. Medical Gas Committee Phoenix AZ
Street Address:
City:
State:
Zip:
Submittal Date: Wed Apr 08 12:49:09 EDT 2015

Committee Statement

Resolution: FR-679-NFPA 99-2015
Statement: Revised to clarify application is to both gas and vacuum and that both the process as well as the procedure need to be documented.

Public Input No. 175-NFPA 99-2015 [Section No. 5.1.12.2.2]

5.1.12.2.2 Initial Piping Blowdown.

Piping in medical gas and vacuum distribution systems shall be blown clear by means of oil-free, dry nitrogen NF ***[@50 PSI]*** after installation of the distribution piping but before installation of station outlet/inlet rough-in assemblies and other system components (e.g., pressure/vacuum alarm devices, pressure/vacuum indicators, pressure relief valves, manifolds, source equipment).

Statement of Problem and Substantiation for Public Input

A set amount of pressure should be listed as a giudeline for performing this test. 50 PSI is reasonable as this is also used in cross connection testing.

Submitter Information Verification

Submitter Full Name: HANS DALKE
Organization: PLUMBERS LOCAL UNION 27
Affilliation: Medical Gas Insrtructor Plumbers Local Union #27
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 03 22:57:48 EDT 2015

Committee Statement

Resolution: There has not been technical justification submitted that demonstrates that there is a need to specify a pressure for this test or that this pressure (50 psi) is the right one in all applications.

Public Input No. 308-NFPA 99-2015 [Section No. 5.1.12.2.6.5]

5.1.12.2.6.5 * ~~At the conclusion of the tests, there shall be no change in the test pressure except that attributed to specific changes in ambient temperature.~~ The leakage over the 24 hour test shall not exceed 0.5% of the starting pressure (e.g. 2 kPa (0.3 psi) starting at 415 kPa (60 psig), 0.3 mmHg (0.125) inHg starting at 635 mmHg (25 inHgV))

Statement of Problem and Substantiation for Public Input

The leakage requirements as currently stated are in fact physically impossible. All systems leak to some extent, and the only reason we can pass the current requirement at all is that we use gauges which naturally have a limit on their readability and resolution. Therefore we can "fudge" the "no change in the test pressure" required by the standard.
As gauges are improving, becoming more precise and digital, it is increasingly difficult to rely on this anachronism to pass the test. As a result, failures are being reported on processes which formerly passed. It is clear we have grown out of this requirement and need something more realistic and fitting the real conditions.
Worse, there are two mutually contradictory tests given. 5.1.6.2 permits a loss from a manufactured assembly of of 1% of the starting pressure in 24 hours. 5.1.12.2.6.5 and permits no loss from the piping system in 24 hours. Clearly, a product can pass the factory test and fail the field test - if the gauge is accurate.

Submitter Information Verification

Submitter Full Name: MARK ALLEN
Organization: BEACON MEDAES
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jul 01 15:28:08 EDT 2015

Committee Statement

Resolution: FR-643-NFPA 99-2015
Statement: Copy from related revision.

Public Input No. 349-NFPA 99-2015 [Section No. 5.1.12.2.6.7]

5.1.12.2.6.7

The 24-hour standing pressure test of the positive pressure system shall be witnessed by an ASSE 6020, *Professional Qualifications Standard for Medical Gas Systems Inspector* , the authority having jurisdiction, or its designee. A form indicating that this test has been performed and witnessed shall be provided to the verifier at the start of the tests required in 5.1.12.3.

Statement of Problem and Substantiation for Public Input

Often times there is not an AHJ available to witness this test, and more times than not, this test is not witnesses. If we allow for an ASSE 6020 Inspector to witness the test, it will be more likely for this test to be witnessed and more importantly documented. There is precedent for this as it is already being done in some states as required by those individual states.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 350-NFPA 99-2015 [New Section after 5.1.12.3]	

Submitter Information Verification

Submitter Full Name: JONATHAN WILLARD
Organization: ACUTE MEDICAL GAS SERVICES
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jul 05 10:43:13 EDT 2015

Committee Statement

Resolution: FR-637-NFPA 99-2015
Statement: Often times there is not an AHJ available to witness this test, and more times than not, this test is not witnessed. Allowing for an ASSE 6020 Inspector or ASSE 6030 verifier to witness the test, it will be more likely for this test to be witnessed and more importantly documented.

Public Input No. 350-NFPA 99-2015 [New Section after 5.1.12.3]

5.1.12.3 System Inspection.

5.1.12.3.1 General.

5.1.12.3.1.1 System inspections shall be performed prior to conceiling piping distribution systems in walls, ceilings, chases, trenches, underground, or otherwise hidden from view.

5.1.12.3.1.2 The test gas shall be nitrogen NF.

5.1.12.3.1.3 Inspections shall be conducted by a party technically competent and experienced in the feild of medical gas and vacuum pipeline inspections and testing and meeting the requirements of ASSE 6020, Professional Qualifications Standard for Medical Gas Systems Inpectors.

5.1.12.3.1.4 Inspections shall be perfomred by a party other than the installing contractor.

5.1.12.3.1.5 When systems have not been installed by in-house personnel, inspections shall be permitted by personnel of the organization who meet the requirements of 5.1.12.3.1.3.

5.1.12.3.2 Inspections

5.1.12.3.2.1 The Initial Pressure Tests perfomed by the installing contractor shall be witnessed by the ASSE 6020 inspector, the Authority Having Jurisdiction, or it's designee. A form indicating that this tes has been performed and witnessed shall be provided to the verifier at the start of the tests required in 5.1.12.3 (5.1.12.4 if added and System Verification is renumbered).

5.1.12.3.2.2 The presense and correctness of labeling and valve tagging required by this code for all concealed components and piping distribution systems shall be inspected.

Statement of Problem and Substantiation for Public Input

This would require that the concealed piping distribution system and associated components are inspected prior to being concealed. This will eliminate systems being installed that are not properly labeled or pressure tested. And eliminate system failures during the verification "phase". This is being required by some states already and precedence has been established for this requirement.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 349-NFPA 99-2015 [Section No. 5.1.12.2.6.7]	similar wording

Submitter Information Verification

Submitter Full Name: JONATHAN WILLARD
Organization: ACUTE MEDICAL GAS SERVICES
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jul 05 10:48:51 EDT 2015

Committee Statement

Resolution: FR-631-NFPA 99-2015
Statement: This revision will require that the concealed piping distribution system and associated components are inspected prior to being concealed. This will eliminate systems being installed that are not properly labeled or pressure tested. And eliminate system failures during the verification phase. This is being required by some states already and precedence has been established for this requirement.

Public Input No. 204-NFPA 99-2015 [Section No. 5.1.12.3.1.3]

5.1.12.3.1.3

Testing shall be conducted by a party technically competent and experienced in the field of medical gas and vacuum pipeline testing and meeting the requirements of ASSE 6030, *Professional Qualifications Standard for Medical Gas Systems Verifiers*, except as required by 5 .1.12.3.1.4.

Statement of Problem and Substantiation for Public Input

The ASSE has a new standard ASSE 6035, Professional Qualifications Standard for Bulk Medical Gas Systems Verifiers. The proposed change calls out an exception for testing that specifically deals with the cryogenic fluid supply system.

Submitter Information Verification

Submitter Full Name: KAREN KOENIG
Organization: CGA
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jun 15 16:01:12 EDT 2015

Committee Statement

Resolution: FR-639-NFPA 99-2015
Statement: The ASSE has a new standard ASSE 6035, Professional Qualifications Standard for Bulk Medical Gas Systems Verifiers. The proposed change calls out an exception for testing that specifically deals with the cryogenic fluid supply system.

Public Input No. 205-NFPA 99-2015 [New Section after 5.1.12.3.1.4]

5.1.12.3.1.4

Testing of the cryogenic fluid supply system shall be conducted by a party technically competent and experienced in the field of cryogenic fluid systems and meeting the requirements of ASSE 6035, *Professional Qualifications Standard for Bulk Medical Gas Systems Verifiers* in accordance with the requirements in CGA M-1, *Standard for Medical Gas Supply Systems at Health Care Facilities* .

Statement of Problem and Substantiation for Public Input

The ASSE has a new standard ASSE 6035, Professional Qualifications Standard for Bulk Medical Gas Systems Verifiers. A new section should be added to address this new requirement.

Submitter Information Verification

Submitter Full Name: KAREN KOENIG
Organization: CGA
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jun 15 16:02:57 EDT 2015

Committee Statement

Resolution: FR-638-NFPA 99-2015
Statement: PI 205

Public Input No. 46-NFPA 99-2015 [Section No. 5.1.12.3.1.4]

5.1.12.3.1.4

Testing shall be performed by a ~~party other than the~~ party other than the installing contractor and contracted by the Engineer of record .

Statement of Problem and Substantiation for Public Input

to ensure that the engineer of record has the system he designed and to reduce conflicts of interest with verifiers that sell medical gas products or installation supplies.

Submitter Information Verification

Submitter Full Name: John Gregory
Organization: HDR Architecture Inc.
Affilliation: P.I.P.E. Medical Gas Committee Phoenix AZ
Street Address:
City:
State:
Zip:
Submittal Date: Thu Apr 09 14:11:42 EDT 2015

Committee Statement

Resolution: Not all cases have an engineer of record. Further, it is typical that a facility is the one who hires a verifier. Contract negotiations should not be addressed in this code.

Public Input No. 309-NFPA 99-2015 [Section No. 5.1.12.3.2]

5.1.12.3.2* Standing Pressure Test.

Piping systems shall be subjected to a 10-minute standing pressure test at operating line pressure using the following procedure:

(1) After the system is filled with nitrogen or source gas, the source valve and all zone valves shall be closed.

(2) ~~The piping system shall show no decrease in pressure after 10 minutes~~ 5.1.12.2.3.2 The leakage over the 10 minutes test shall not be visible on a test gauge readable in 1 psi / 1 inHgV increments or digital gauge readable to ±2% of scale .

(3) Any leaks found shall be located, repaired, and retested per 5.1.12.2.6.

Statement of Problem and Substantiation for Public Input

The leakage requirements as currently stated are in fact physically impossible. All systems leak to some extent, and the only reason we can pass the current requirement at all is that we use gauges which naturally have a limit on their readability and resolution. Therefore we can "fudge" the "no change in the test pressure" required by the standard.
As gauges are improving, becoming more precise and digital, it is increasingly difficult to rely on this anachronism to pass the test. As a result, failures are being reported on processes which formerly passed. It is clear we have grown out of this requirement and need something more realistic and fitting the real conditions.
Worse, there are two mutually contradictory tests given. 5.1.6.2 permits a loss from a manufactured assembly of of 1% of the starting pressure in 24 hours. 5.1.12.2.6.5 and permits no loss from the piping system in 24 hours. Clearly, a product can pass the factory test and fail the field test - if the gauge is accurate.

Submitter Information Verification

Submitter Full Name: MARK ALLEN
Organization: BEACON MEDAES
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jul 01 15:30:14 EDT 2015

Committee Statement

Resolution: The proposed revision is not needed for the 10 minute test. The accuracy of the gauge is already addressed in 5.1.12.1.13.

Public Input No. 356-NFPA 99-2015 [New Section after 5.1.12.3.7.1]

5.1.12.3.7.2

This test shall be permitted to be performed using a gas particle counter. The particle counter shall be able to measure smaller than .45 micron particles for a maximum number of particles being less than (X) / Cubic Foot of Gas.

Statement of Problem and Substantiation for Public Input

This is to allow for another technology to be utilized for this testing. The test criteria needs to be established. I will conduct some research to bring to the meeting for discussions sake and to assist with developing the test criteria.

Submitter Information Verification

Submitter Full Name: JONATHAN WILLARD
Organization: ACUTE MEDICAL GAS SERVICES
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jul 05 11:44:11 EDT 2015

Committee Statement

Resolution: The additional research that was referenced in the substantiation was not provided. The TC will need this additional information and specific numbers in order to develop appropriate code language.

Public Input No. 362-NFPA 99-2015 [Section No. 5.1.12.3.8.1]

5.1.12.3.8.1

These tests shall be performed with oil-free, dry nitrogen NF or the system gas. If the system gas is used, the test criteria shall be modified for the system gas as deefined by the USP / NF specifications.

Statement of Problem and Substantiation for Public Input

If medical air is used for the piping purity test, the piping system would fail (as written today) due to higher dew points than would be allowed for this test. Medical air system may operate at 32 degrees F, but the test requires a dew point lower than -12 degrees C (10 degrees F).

Submitter Information Verification

Submitter Full Name: JONATHAN WILLARD
Organization: ACUTE MEDICAL GAS SERVICES
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jul 05 12:04:04 EDT 2015

Committee Statement

Resolution: The suggestion revision requires additional technical review and substantiation in the comment stage.

Public Input No. 368-NFPA 99-2015 [Section No. 5.1.12.3.8.2]

5.1.12.3.8.2

The outlet most remote from the source shall be tested for total non-methane hydrocarbons, halogenated hydrocarbons, and dew point, and compared to the source gas.

Statement of Problem and Substantiation for Public Input

Halogenated hydrocarbons is a comparative test. This should be added to this requirement to clarify.
Also, the dew point test should be a comparative test. The test as written does not provide us with any real or valuable information as to whether there is moisture being added to the test gas as a result of poor installation practices.
There is another PI that changes the text of 5.1.12.3.8.6 as well to modify the test to be a comparative test.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 372-NFPA 99-2015 [Section No. 5.1.12.3.8.6]	

Submitter Information Verification

Submitter Full Name: JONATHAN WILLARD
Organization: ACUTE MEDICAL GAS SERVICES
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jul 05 12:12:17 EDT 2015

Committee Statement

Resolution: FR-653-NFPA 99-2015
Statement: Halogenated hydrocarbons is a comparative test. This has been added to this subsection to clarify.

Public Input No. 372-NFPA 99-2015 [Section No. 5.1.12.3.8.6]

5.1.12.3.8.6

The difference between these two tests shall in no case exceed a moisture concentration of ~~the outlet test shall not exceed 500~~ 370 ppm or ~~an equivalent~~ a pressure dew point of ~~-12°C~~ 5°C (~~10°F~~ 9°F) at a gauge pressure of 345 kPa (50 psi).

Statement of Problem and Substantiation for Public Input

This test should be a comparative test like the others for purity. With this test we are trying to determine if there is any additional moisture being added to the test gas as a result of poor installation practices. As currently written we are not comparing the outlet most remote from the test gas and therefore, we do not know if any moisture is being added. Nitrogen is very dry and a great deal of moisture may be added to the gas and still pass this test.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 368-NFPA 99-2015 [Section No. 5.1.12.3.8.2]	dew point

Submitter Information Verification

Submitter Full Name: JONATHAN WILLARD
Organization: ACUTE MEDICAL GAS SERVICES
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jul 05 12:17:31 EDT 2015

Committee Statement

Resolution: The suggested revision requires additional technical review and substantiation in the comment stage.

Public Input No. 431-NFPA 99-2015 [Section No. 5.1.12.3.8.6]

5.1.12.3.8.6

The moisture concentration of the outlet test shall not exceed 500 ppm or an equivalent pressure dew point of ~~-12°C~~ (~~10°F~~ ?) at a gauge pressure of 345 kPa (50 psi).

Statement of Problem and Substantiation for Public Input

This is a placeholder for the Task Group #1 discussion.

Submitter Information Verification

Submitter Full Name: JONATHAN WILLARD
Organization: ACUTE MEDICAL GAS SERVICES
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 13:07:02 EDT 2015

Committee Statement

Resolution: The committee is open to receiving more research and analysis of dew point requirements. The discussion in the meeting resolved that there is not a clinical concern at any of the possible levels since for clinical applications, the air is needed to be humidifies regardless. The analysis should review what dew point levels can result in water in a pipeline or water causing mechanical damage.

Public Input No. 380-NFPA 99-2015 [Section No. 5.1.12.3.9]

5.1.12.3.9 Final Vacuum Tie-In Test.

5.1.12.3.9.1

Prior to the connection of any work or any extension or addition to an existing vacuum piping system, the tests in 5.1.12.3.1 through 5.1.12.3.8 shall be successfully performed on the new work.

5.1.12.3.9.2

Each joint in the final connection between the new work and the existing system shall be tested using an ultrasonic leak detector or other means that will allow detection of leaks in an active vacuum system.

5.1.12.3.9.3

Before the new work is used for patient care, the vacuum system shall be tested for operational pressure in accordance with 5.1.12.3.11 .

5.1.12.3.9.4

Permanent records of these tests shall be maintained in accordance with 5.1.14.4 .

5.1.12.3.10 Final Support Gas Tie -in Test.

5.1.12.3.10.1

Prior to the connection of any extension or addition to an existing support gas piping system, the tests in 5.1.12.3.1 through 5.1.12.3.8 shall be successfully performed on the new work.

5.1.12.3.10.2

Each joint in the final connection between the new work and the existing system shall be leak- tested with the gas of system designation at the normal operating pressure by means of a leak detectant that is safe for use with oxygen and does not contain ammonia.

5.1.12.3.

~~9~~

10 .3

~~Vacuum joints shall be tested using an ultrasonic leak detector or other means that will allow detection of leaks in an active vacuum system.~~

~~5.1.12.3.9.4~~

~~For pressure gases, immediately~~

Immediately after the final brazed connection is made and leak-tested, an outlet in the new piping and an outlet in the existing piping that are immediately downstream from the point or area of intrusion shall be purged in accordance with the applicable requirements of 5.1.12.3.6 .

5.1.12.3.

~~9~~

10 .

~~5~~

4

Before the new work is used ~~for patient care~~ , ~~positive pressure~~ the gases shall be tested for operational pressure ~~and gas concentration~~ in ~~accordance~~ accordnace with 5.1.12.3.10 ~~and 5~~ . ~~1.12.3.11.~~

5.1.12.3.

~~9~~

10 .

~~6~~

5

~~Permanent~~ Permenant records of these tests shall be maintained in accordance with 5.1.14.4 .

Statement of Problem and Substantiation for Public Input

This will eliminate "dirty" joints from being installed on positive pressure patient respired gas systems.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 379-NFPA 99-2015 [Section No. 5.1.12.3.9.1]	same section

Submitter Information Verification

Submitter Full Name: JONATHAN WILLARD
Organization: ACUTE MEDICAL GAS SERVICES
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jul 05 12:37:35 EDT 2015

Committee Statement

Resolution: The proposed language would not eliminate the "dirty joint" issue identified in the submitters substantiation. This is addressed in Section 5.1.10.4.5.10.

Public Input No. 379-NFPA 99-2015 [Section No. 5.1.12.3.9.1]

5.1.12.3.9.1

Prior to the connection of any work or any extension or addition to an existing vacuum or support gas piping system, the tests in 5.1.12.3.1 through 5.1.12.3.8 shall be successfully performed on the new work.

Statement of Problem and Substantiation for Public Input

The final tie-in should only be allowed for vacuum piping systems. We strive to minimize or eliminate possible contamination for the piping systems, but then allow a "dirty" joint to be completed at the beginning of a new (clean) piping system. This should not be allowed on positive pressure respired gas systems. This would modify this test to only be allowed on vacuum and support gas systems.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 380-NFPA 99-2015 [Section No. 5.1.12.3.9]	

Submitter Information Verification

Submitter Full Name: JONATHAN WILLARD
Organization: ACUTE MEDICAL GAS SERVICES
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jul 05 12:33:18 EDT 2015

Committee Statement

Resolution: Copy committee statement from PI 380.

Public Input No. 274-NFPA 99-2015 [Section No. 5.1.12.3.10]

5.1.12.3.10 Operational ~~Pressure~~ Flow pressure drop Test.

Operational flow pressure drop tests shall be performed at each station outlet/inlet or terminal where the user makes connections and disconnections.

5.1.12.3.10.1

Tests shall be performed with the gas of system designation or the operating vacuum.

5.1.12.3.10.2

All gas outlets with a gauge pressure of 345 kPa (50 psi), including, but not limited to, oxygen, nitrous oxide, medical air, and carbon dioxide, shall deliver 100 SLPM (3.5 SCFM) with a pressure drop of not more than 35 kPa (5 psi) and static pressure of 345 kPa to 380 kPa (50 psi to 55 psi).

5.1.12.3.10.3

Support gas outlets shall deliver 140 SLPM (5.0 SCFM) with a pressure drop of not more than 35 kPa (5 psi) gauge and static pressure of 1100 kPa to 1275 kPa (160 psi to 185 psi) gauge.

5.1.12.3.10.4

Medical–surgical vacuum inlets shall draw 85 Nl/min (3 SCFM) without reducing the vacuum pressure below 300 mm (12 in.) gauge HgV at any adjacent station inlet.

5.1.12.3.10.5

Oxygen and medical air outlets serving critical care areas shall allow a transient flow rate of 170 SLPM (6 SCFM) for 3 seconds.

5.1.12.3.10.6*

Where outlets are being fed with non-standard line pressure, volume, or gas content, for clinical reasons, they shall be labeled in accordance with 5.1.11.

Statement of Problem and Substantiation for Public Input

We are actually ensuring required flow rates with maximum pressure drops in this section. The current section title Operational Pressure Test is not really accurate.

Submitter Information Verification

Submitter Full Name: JAMES LUCAS
Organization: TRI-TECH MEDICAL INC
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jun 29 14:14:16 EDT 2015

Committee Statement

Resolution: FR-659-NFPA 99-2015
Statement: We are actually ensuring required flow rates with maximum pressure drops in this section. The current section title Operational Pressure Test is not accurate.

Public Input No. 373-NFPA 99-2015 [Section No. 5.1.12.3.10.5]

5.1.12.3.10.5

Oxygen and medical air outlets serving ~~critical care areas.~~ Category 1 space shall allow a transient flow rate of 170 SLPM (6 SCFM) for 3 seconds.

Statement of Problem and Substantiation for Public Input

Definition for Critical Care Area is covered in NFPA 99: 3.3.137 Patient Care Space and is designated as Category 1 Space. Any references in NFPA 99 to “Critical Care Area” should be changed to “Category 1 Space”.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 357-NFPA 99-2015 [Section No. 3.3.28]	

Submitter Information Verification

Submitter Full Name: GARY BECKSTRAND
Organization: UTAH ELECTRICAL JATC
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jul 05 12:17:39 EDT 2015

Committee Statement

Resolution: FR-604-NFPA 99-2015
Statement: temrinology

Public Input No. 142-NFPA 99-2015 [Section No. 5.1.12.3.11]

5.1.12.3.11 Medical Gas Concentration Test.

After purging each system with the gas of system designation, the following shall be performed:

(1) Each pressure gas source and outlet shall be analyzed for concentration of gas, by volume.

(2) Analysis shall be conducted with instruments designed to measure the specific gas dispensed.

(3) * Allowable concentrations shall be as indicated in Table 5.1.12.3.11.

Table 5.1.12.3.11 Gas Concentrations

Medical Gas	Concentration
Oxygen (supplied from cylinder or liquid sources)	≥99% oxygen
Oxygen (Supplied from Oxygen Supply System Using Concentrators)	≥90% oxygen
Nitrous oxide	≥99% nitrous oxide
Nitrogen	≤1% oxygen or ≥99% nitrogen
Medical air	19.5%–23.5% oxygen
Other gases	
~~As specified~~	
named gases by ±1%,	
~~unless otherwise specified~~	
or per specification	

Statement of Problem and Substantiation for Public Input

These changes are necessary to support the oxygen concentrator source

Other gases has been reworded only for clarity.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 135-NFPA 99-2015 [New Section after 5.1.3.8.5]	Parent

Submitter Information Verification

Submitter Full Name: MARK ALLEN
Organization: BEACON MEDAES
Street Address:

City:
State:
Zip:
Submittal Date: Mon May 25 12:16:04 EDT 2015

Committee Statement

Resolution: FR-660-NFPA 99-2015
Statement: These changes are necessary to support the oxygen concentrator source

Other gases has been reworded only for clarity.

Public Input No. 432-NFPA 99-2015 [Section No. 5.1.12.3.12.3]

5.1.12.3.12.3

The test results shall not exceed the parameters in Table 5.1.12.3.12.3.

Table 5.1.12.3.12.3 Contaminant Parameters for Medical Air

Parameter	Limit Value
Pressure dew point	~~2°C~~ ?°C (~~35°F~~ ?°F)
Carbon monoxide	10 ppm
Carbon dioxide	500 ppm
Gaseous hydrocarbons	25 ppm (as methane)
Halogenated hydrocarbons	2 ppm

Statement of Problem and Substantiation for Public Input

This is a placeholder for the Task Group #1 discussion.

Submitter Information Verification

Submitter Full Name: JONATHAN WILLARD
Organization: ACUTE MEDICAL GAS SERVICES
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 13:08:31 EDT 2015

Committee Statement

Resolution: The committee is open to receiving more research and analysis of dew point requirements. The discussion in the meeting resolved that there is not a clinical concern at any of the possible levels since for clinical applications, the air is needed to be humidifies regardless. The analysis should review what dew point levels can result in water in a pipeline or water causing mechanical damage.

Public Input No. 143-NFPA 99-2015 [New Section after 5.1.12.3.14.3]

5.1.12.3.14.3 Oxygen Supply System Using Concentrators

(1) The oxygen supply system shall include purity test(s) for the oxygen, tests of the alarms after calibration and setup per the manufacturer's instructions, and operational controls,

(2) Each concentrator unit shall be operated with the unit isolating valve closed and the unit venting at a flow of 25% or more of nameplate capacity for an elapsed time of at least 12 hours prior to the tests in (3) below,

(3) The oxygen quality from each concentrator unit shall be validated as follows:

(a) The operation of all control sensors/switches and the oxygen monitor shall be checked for proper operation and function,

(b) The quality of the oxygen shall be confirmed to meet the USP monograph appropriate for the technology in use,

(c) The accuracy of the oxygen monitor shall be validated against oxygen of known concentration, and the monitor calibrated.

(4) The supply system shall be tested for correct operation of the cascade (primary - secondary - reserve). It shall be permitted to test source rotation for systems so constructed,

(5) The operation of all alarms (see 5.1.9.2.4 (14) and 5.1.9.5.4 (12)) shall be tested,

(6) The accuracy of the system oxygen monitor shall be validated against oxygen of known concentration, and the monitor calibrated,

(7) Tests in 5.1.12.3.14.3 (3) to (5) shall be performed when concentrator units have been opened to atmosphere (e.g during service or replacement).

Statement of Problem and Substantiation for Public Input

These changes are necessary to support concentrator sources

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 135-NFPA 99-2015 [New Section after 5.1.3.8.5]	Parent

Submitter Information Verification

Submitter Full Name: MARK ALLEN
Organization: BEACON MEDAES
Street Address:
City:
State:
Zip:
Submittal Date: Mon May 25 12:21:24 EDT 2015

Committee Statement

Resolution: FR-661-NFPA 99-2015
Statement: These tests have been added to support the addition of concentrator sources and to verify that they are operating properly prior to use.

Public Input No. 158-NFPA 99-2015 [Section No. 5.1.12.3.14.3(A)]

(A)

Tests of the medical air compressor system shall include the purity test for air quality, and the test of the alarm sensors after calibration and setup per the ~~manufacturer's~~ manufacturer's instructions, as well as ~~lead-lag~~ reserve capacity controls.

Statement of Problem and Substantiation for Public Input

The standard was written around one type of control (on/off operation defined by pressure). Control methods for compressors and pumps are becoming more sophisticated and now can control on other conditions (e.g. flow) and in a variety of modes (e.g. continuous run with VSD). The proposed text attempts to account for these developments while preserving the performance characteristics inherent in the original text.

Submitter Information Verification

Submitter Full Name: MARK ALLEN
Organization: BEACON MEDAES
Street Address:
City:
State:
Zip:
Submittal Date: Mon May 25 13:46:57 EDT 2015

Committee Statement

Resolution: FR-662-NFPA 99-2015
Statement: The standard was written around one type of control (on/off operation defined by pressure). Control methods for compressors and pumps are becoming more sophisticated and now can control on other conditions (e.g. flow) and in a variety of modes (e.g. continuous run with VSD). The proposed text attempts to account for these developments while preserving the performance characteristics inherent in the original text.

Public Input No. 422-NFPA 99-2015 [Section No. 5.1.12.3.14.3(H)]

(H)

A demand of approximately 25 percent of the rated compressor capacity shall be created to cause the compressors to cycle on and off continuously and the dryers to operate for the ~~24~~ 12 -hour period.

Statement of Problem and Substantiation for Public Input

To match item (E), which states the compressor system shall operate for at least 12 hours prior to testing. This should have been corrected in this edition. I believe we talked about it in the last cycle.

Submitter Information Verification

Submitter Full Name: JONATHAN WILLARD
Organization: ACUTE MEDICAL GAS SERVICES
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 12:12:02 EDT 2015

Committee Statement

Resolution: FR-663-NFPA 99-2015
Statement: This has been revised to match item (E), which states the compressor system shall operate for at least 12 hours prior to testing. This should have been corrected in the current edition.

Public Input No. 532-NFPA 99-2015 [Section No. 5.1.12.3.14.3(H)]

(H)

A demand of approximately 25 percent of the rated compressor capacity shall be created to cause the compressors to cycle on and off continuously and the dryers to operate for the ~~24~~ 12 -hour period.

Statement of Problem and Substantiation for Public Input

This is a simple correction to match the hours in paragraph E. Paragraphs E and H are both referring to the same test.

Submitter Information Verification

Submitter Full Name: CORKY BISHOP
Organization: AIRGAS USA LLC
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 18:28:57 EDT 2015

Committee Statement

Resolution: FR-663-NFPA 99-2015
Statement: This has been revised to match item (E), which states the compressor system shall operate for at least 12 hours prior to testing. This should have been corrected in the current edition.

Public Input No. 58-NFPA 99-2015 [New Section after 5.1.12.3.14.5]

5.1.12.4 Inspections

5.1.12.4.1 General.

5.1.12.4.1.1 Inspections shall be performed and witnessed for all required tests in 5.1.12.2 Installer Performed Tests.

5.1.12.4.1.2 The test gas shall be dry nitrogen NF or the system gas where permitted.

5.1.12.4.1.3 Inspections shall be conducted by a third party technically competent and experienced in the field of medical gas and vacuum pipeline inspections and meeting the requirements of ASSE 6020, *Professional Qualifications Standard for Medical Gas Systems Inspectors and Performance requirements as outlined in Annex B* .

5.1.12.4.1.4 Inspections shall be performed by a party other than the owner, installing contractor or the system verifier. This individual shall be considered the Engineer of Record, AHJ or their Designee for the medical gas system.

5.1.12.4.1.5 All test required under 5.1.12.2 shall be performed per section 5.1.12.2.1.3 through 5.1.12.2.7.7.

5.1.12.4.1.6 The test required by 5.1.12.2 shall be performed and documented by the installing contractor and witnessed by the Engineer of Record, AHJ or their Designee prior to proceeding to the next test.

5.1.12.4.1.7 The test gas shall be dry Nitrogen NF regardless of the size of the system, which include the following:

(1) Initial piping blow down (see 5.1.12.2.2)

(2) Initial pressure test (see 5.1.12.2.3)

(3) Initial Cross-connection test (see 5.1.12.2.4)

(4) Initial Piping purge test (see 5.1.12.2.5)

(5) Standing Pressure test (see 5.1.12.2.6)

5.1.12.4.1.8 Modified test against live systems shall be performed with a lower pressure than the live system, or use bottled gas of like system testing.

5.1.12.4.2 Initial Piping Blow Down. Piping in medical gas and vacuum distribution systems being installed or altered shall be blown clear as outlined in section 5.1.12.2.3. The AHJ or its Designee shall witness and document this test before proceeding on to the next test.

5.1.12.4.2.1 This test shall also apply to the manufactured assemblies. The witnessed test documentation for the manufactured assembly shall be submitted and in hand prior to the next test or the next test shall not proceed.

5.1.12.4.3 **Initial Pressure Test.** Piping systems shall be subjected to a 1.5 times normal operating pressure using the following procedure:

(1) After the system is filled with dry Nitrogen NF, the Nitrogen NF valve shall be closed.

(2) The piping system shall not decrease in pressure while each joint is leak tested per 5.1.12.2.3.5.

(3) Any leaks found shall be located, repaired, and retested, until no leaks are present.

5.1.12.4.4 **Cross-Connection Test.** It shall be determined that no cross-connections exist between the various medical gas and vacuum piping systems. Test shall be as described in section 5.1.12.2.4. The Engineer of record, AHJ or their Designee shall witness and document this test before proceeding on to the next test.

5.1.12.4.5 Initial Piping Purge Test. The outlet in each medical gas piping system shall be purged to remove any particulate matter from the distribution piping. Test shall be as described in section 5.1.12.2.5. The Engineer of Record, AHJ or their Designee shall witness and document this test before proceeding on to the next test.

5.1.12.4.6. Standing Pressure Test for Positive Pressure Medical Gas Piping. After successful completion of the required tests 5.1.12.2.2 through 5.1.12.2.5, medical gas distribution piping shall be subject to a standing pressure test per 5.1.12.2.6. The Engineer of Record, AHJ or their Designee shall witness and document this test before proceeding on to the next test.

5.1.12.4.7 Standing Vacuum Test for Vacuum Piping. After successful completion of the required tests 5.1.12.2.2 through 5.1.12.2.5, medical vacuum distribution piping shall be subject to a standing vacuum test per 5.1.12.2.7. The Engineer of Record, AHJ or their Designee shall witness and document this test before proceeding on to the next test.

5.1.12.4.7.1 The standing vacuum test shall use a medical grade portable vacuum pump and not the house system.

5.1.12.4.8 Documented Tests Reports. After successful completion of all contractor required tests, witnessed and recorded documents shall be submitted to the Verifier for their records.

5.1.12.4.8.1 Verifiers Documented Report. After completion of the verification process, the verifier's report shall be submitted to the Engineer of Record, AHJ or their Designee for final review before medical gas system being turned over for patient use.

Statement of Problem and Substantiation for Public Input

Provides guidelines for inspecting medical gas systems.

Submitter Information Verification

Submitter Full Name: John Gregory

Organization: HDR Architecture Inc.
Affilliation: P.I.P.E. Medical Gas Committee Phoenix AZ
Street Address:
City:
State:
Zip:
Submittal Date: Thu Apr 09 16:07:49 EDT 2015

Committee Statement

Resolution: See the committee action on PI 350.

Public Input No. 290-NFPA 99-2015 [Section No. 5.1.13.1.2]

5.1.13.1.2

Support gas sources shall be permitted to be used for many general utility uses (e.g., to remove excess moisture from instruments before further processing, or to operate gas-driven booms, boom brakes, pendants, or similar applications). Requirements for general utility systems will be found in Chapter ~~9~~ 8 .

Statement of Problem and Substantiation for Public Input

Nonmedical Compressed Air is addressed in chapter 8. Chapter 9 is HVAC systems.

Another option is to delet the last sentence altogether.

Submitter Information Verification

Submitter Full Name: CORKY BISHOP
Organization: AIRGAS USA LLC
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 30 11:36:41 EDT 2015

Committee Statement

Resolution: FR-664-NFPA 99-2015
Statement: Nonmedical Compressed Air is addressed in chapter 8. Chapter 9 is HVAC systems.

Public Input No. 433-NFPA 99-2015 [Section No. 5.1.13.3.5.1]

5.1.13.3.5.1 Quality of Instrument Air.

The quality of instrument air shall be as follows:

(1) Compliant with ANSI/ISA S-7.0.01, *Quality Standard for Instrument Air*

(2) Filtered to 0.01 micron

(3) Free of liquids (e.g., water, hydrocarbons, solvents)

(4) Free of hydrocarbon vapors

(5) Dry to a dew point of ~~=40°C~~ ?°C (~~=40°F~~ ?°F)

Statement of Problem and Substantiation for Public Input

This is a placeholder for the Task Group #1 discussion.

Submitter Information Verification

Submitter Full Name: JONATHAN WILLARD
Organization: ACUTE MEDICAL GAS SERVICES
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 13:10:00 EDT 2015

Committee Statement

Resolution: The committee is open to receiving more research and analysis of dew point requirements. The discussion in the meeting resolved that there is not a clinical concern at any of the possible levels since for clinical applications, the air is needed to be humidifies regardless. The analysis should review what dew point levels can result in water in a pipeline or water causing mechanical damage.

Public Input No. 54-NFPA 99-2015 [Section No. 5.1.13.3.5.3]

5.1.13.3.5.3

Instrument air sources shall provide air with the following characteristics:

(1) A gauge pressure ~~not less than 1380 kPa (200 psi) at the compressor~~ adequate for the intended line pressure and pressure controls (see Table 5.1.11)

(2) The quality of instrument air, as described in 5.1.13.3.5.1

Additional Proposed Changes

File Name	Description	Approved
IAir_Pressure.pdf	The summary of the changes required for this proposal	

Statement of Problem and Substantiation for Public Input

The original justification for the 200 psi compressor was based on using classic pressure regulators to ensure a 185 psi line pressure. As regulators inevitably have some pressure drop, the pressure needed to drive the regulators had to be higher. This reasoning no longer pertains, as technologies now exist which can control the pressure by means other than pressure regulation, and not all facilities wish to operate their instrument air at 185 psi.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 55-NFPA 99-2015 [Section No. 5.1.13.3.5.10]	
Public Input No. 56-NFPA 99-2015 [New Section after 5.1.13.7]	
Public Input No. 57-NFPA 99-2015 [Section No. 5.1.13.3.5.6]	

Submitter Information Verification

Submitter Full Name: Mark Allen
Organization: Beacon Medaes
Street Address:
City:
State:
Zip:
Submittal Date: Thu Apr 09 15:49:29 EDT 2015

Committee Statement

Resolution: FR-665-NFPA 99-2015

Statement: The original justification for the 200 psi compressor was based on using classic pressure regulators to ensure a 185 psi line pressure. As regulators inevitably have some pressure drop, the pressure needed to drive the regulators had to be higher. This reasoning no longer pertains, as technologies now exist which can control the pressure by means other than pressure regulation, and not all facilities wish to operate their instrument air at 185 psi.

Public Input No. 289-NFPA 99-2015 [Section No. 5.1.13.3.5.5]

5.1.13.3.5.5

Instrument air sources shall include the components specified in 5.1.3.6.3.2, 5.1.3.6.3.5, 5.1.3.6.3.6, and 5.1.3.6.3.7 [except 5.1.3.6.3.7(1)].

Delete this paragraph and add 5.1.3.6.3.2 and the exception for 5.1.3.6.3.7(1) to section 5.1.13.3.5.10.

Statement of Problem and Substantiation for Public Input

Eliminate duplicated requirements.

Submitter Information Verification

Submitter Full Name: CORKY BISHOP
Organization: AIRGAS USA LLC
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 30 11:27:13 EDT 2015

Committee Statement

Resolution: FR-666-NFPA 99-2015
Statement: This revision eliminates duplicated requirements. Certain provisions have been added to 5.1.13.3.5.10.

Public Input No. 57-NFPA 99-2015 [Section No. 5.1.13.3.5.6]

~~5.1.13.3.5.6~~ –

Instrument air compressors. Instrument air compressors shall be permitted to be of any type capable of ~~not less than a gauge pressure of 1380 kPa (200 psi) output pressure~~ an output pressure adequate for the the intended line pressure (see Table 5.1.11) and of providing air meeting the definition of instrument air in 5.1.13.3.5.1 .

Statement of Problem and Substantiation for Public Input

The original justification for the 200 psi compressor was based on using classic pressure regulators to ensure a 185 psi line pressure. As regulators inevitably have some pressure drop, the pressure needed to drive the regulators had to be higher. This reasoning no longer pertains, as technologies now exist which can control the pressure by means other than pressure regulation, and not all facilities wish to operate their instrument air at 185 psi.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 54-NFPA 99-2015 [Section No. 5.1.13.3.5.3]	

Submitter Information Verification

Submitter Full Name: Mark Allen
Organization: Beacon Medaes
Street Address:
City:
State:
Zip:
Submittal Date: Thu Apr 09 16:02:32 EDT 2015

Committee Statement

Resolution: FR-668-NFPA 99-2015
Statement: The original justification for the 200 psi compressor was based on using classic pressure regulators to ensure a 185 psi line pressure. As regulators inevitably have some pressure drop, the pressure needed to drive the regulators had to be higher. This reasoning no longer pertains, as technologies now exist which can control the pressure by means other than pressure regulation, and not all facilities wish to operate their instrument air at 185 psi.

Public Input No. 55-NFPA 99-2015 [Section No. 5.1.13.3.5.10]

5.1.13.3.5.10 Instrument Air Accessories.

Accessories used for instrument air sources shall comply with the following subparagraphs:

(1) 5.1.3.6.3.5 for aftercoolers

(2) 5.1.3.6.3.6 for air receivers

(3) 5.1.3.6.3.7 for air dryers

(4) ~~- 5.1.3.5.5 for air regulators~~

Statement of Problem and Substantiation for Public Input

The original justification for the 200 psi compressor was based on using classic pressure regulators to ensure a 185 psi line pressure. As regulators inevitably have some pressure drop, the pressure needed to drive the regulators had to be higher. This reasoning no longer pertains, as technologies now exist which can control the pressure by means other than pressure regulation, and not all facilities wish to operate their instrument air at 185 psi.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 54-NFPA 99-2015 [Section No. 5.1.13.3.5.3]	

Submitter Information Verification

Submitter Full Name: Mark Allen
Organization: Beacon Medaes
Street Address:
City:
State:
Zip:
Submittal Date: Thu Apr 09 15:55:34 EDT 2015

Committee Statement

Resolution: FR-667-NFPA 99-2015

Statement: The original justification for the 200 psi compressor was based on using classic pressure regulators to ensure a 185 psi line pressure. As regulators inevitably have some pressure drop, the pressure needed to drive the regulators had to be higher. This reasoning no longer pertains, as technologies now exist which can control the pressure by means other than pressure regulation, and not all facilities wish to operate their instrument air at 185 psi.

Public Input No. 159-NFPA 99-2015 [Section No. 5.1.13.3.5.13]

5.1.13.3.5.13 Electrical Power and Control.

- ~~When multiple compressors are used, an additional compressor(s) shall automatically activate when the compressor(s) in operation is incapable of maintaining the required pressure.~~

~~When multiple compressors are used, automatic or manual alternation of compressors shall allow division of operating time. If automatic alternation of compressors is not provided~~ (A) Instrument air source systems with compressors shall be controlled to ensure continuous supply of air at pressures consistent with Table 5.1.11 under all conditions of system use as follows:

(1) Automatic activation of compressor(s) as necessary to supply the demand.

(2) If provided with more than one compressor, managing the operation to equalize wear on all compressors. Where this equalization is achieved manually, the facility staff shall arrange a schedule for manual alternation.

~~Each compressor motor shall be provided with electrical components including, but not limited to, the following:~~

- ~~Dedicated disconnect switch installed in the electrical circuit ahead of each motor starter~~
- ~~Motor starting device~~
- ~~Overload protection~~

~~Where compressor~~ (B) Controls shall provide the following functions:

(1) Where instrument air source systems having two or more compressors employ ~~a control transformer or other voltage control power device, installation of at least two such devices~~ any electrical circuit device which upon failure could prevent supply of air, the controls shall be provided with a automatically activated alternative method for ensuring supply (i.e. redundant component(s), an alternate electrical supply path or other equivalent method).

(2) Control circuits arranged in such a manner that ~~the shutdown~~ isolation of one compressor or component from the system (e.g. for maintenance or repair) does not interrupt the operation of ~~another compressor~~ other compressor(s) or component(s).

(3) Automatic restart function, such that the ~~compressor(s) will restart~~ supply of air will resume normally after power interruption without manual intervention

(C) Each compressor motor shall be provided with electrical components including, but not limited to, the following:

(1) Dedicated disconnect switch installed in the electrical circuit ahead of each motor starter

(2) Motor starting device

(3) Overload protection

(1) Electrical installation and wiring shall conform to the requirements of *NFPA 70*, *National Electrical Code*.

(2) Emergency electrical service for the compressors shall conform to the requirements of the essential electrical system, as described in Chapter 6.

Statement of Problem and Substantiation for Public Input

The standard was written around one type of control (on/off operation defined by pressure). Control methods for compressors and pumps are becoming more sophisticated and now can control on other conditions (e.g. flow) and in a variety of modes (e.g. continuous run with VSD). The proposed text attempts to account for these developments while preserving the performance characteristics inherent in the original text.

Submitter Information Verification

Submitter Full Name: MARK ALLEN
Organization: BEACON MEDAES
Street Address:
City:
State:
Zip:
Submittal Date: Mon May 25 13:49:09 EDT 2015

Committee Statement

Resolution: FR-683-NFPA 99-2015

Statement: The standard was written around one type of control (on/off operation defined by pressure). Control methods for compressors and pumps are becoming more sophisticated and now can control on other conditions (e.g. flow) and in a variety of modes (e.g. continuous run with VSD). The proposed text attempts to account for these developments while preserving the performance characteristics inherent in the original text.

Previously the language of Item (C) potentially allowed the installation of equipment that did not comply with NFPA70E. The language of (C) and new item (D) has been revised to prevent this.

Public Input No. 339-NFPA 99-2015 [Section No. 5.1.13.3.5.13]

5.1.13.3.5.13 _ Electrical Power and Control.

(1) _ When multiple compressors are used, an additional compressor(s) shall automatically activate when the compressor(s) in operation is incapable of maintaining the required pressure.

(2) _ When multiple compressors are used, automatic or manual alternation of compressors shall allow division of operating time. If automatic alternation of compressors is not provided, the facility staff shall arrange a schedule for manual alternation.

(3) Each compressor motor shall be provided with electrical components including, but not limited to, the following:

(a) Dedicated disconnect switch installed in the electrical circuit ahead of each motor starter

(b) Motor starting device

(c) Overload protection

- ~~Where compressor systems having two or more compressors employ a control transformer or other voltage control power device, installation of at least two such devices~~

(4) Instrument Air Compressor system controls shall be provided with electrical systems including at least:

(a) Built in disconnect means to allow appropriate operation of multiple compressor systems and protect service personnel from exposure to live voltages

(b) ~~Control circuits arranged in such a manner that the shutdown of one compressor does not interrupt the operation of another compressor~~ _ Control circuits arranged so that failure of any component of the control circuit, or shutdown of one compressor (e.g. for service) does not interrupt automatic operation of the standby compressor

(c) Automatic restart function , such that the compressor(s) will restart after power interruption without manual intervention

(d) Where components are common to more than one control circuit (e.g. autodrains) the common device shall be provided with electrical protection to prevent loss of the control circuits(s) in the event of short circuit in the device

(5) _ Electrical installation and wiring shall conform to the requirements of *NFPA 70* , *National Electrical Code* .

(6) Emergency electrical service for the compressors shall conform to the requirements of the essential electrical system, as described in Chapter 6 .

Statement of Problem and Substantiation for Public Input

Lack of language in NFPA 99 allows installation of equipment that does not comply with NFPA70E.
Current designs infield allow for blown fuse to shutdown complete Instrument air system.

Submitter Information Verification

Submitter Full Name: Anthony Lowe
Organization: Allied Hospital Systems
Street Address:
City:
State:
Zip:
Submittal Date: Fri Jul 03 13:26:38 EDT 2015

Committee Statement

Resolution: FR-683-NFPA 99-2015

Statement: The standard was written around one type of control (on/off operation defined by pressure). Control methods for compressors and pumps are becoming more sophisticated and now can control on other conditions (e.g. flow) and in a variety of modes (e.g. continuous run with VSD). The proposed text attempts to account for these developments while preserving the performance characteristics inherent in the original text.

Previously the language of Item (C) potentially allowed the installation of equipment that did not comply with NFPA70E. The language of (C) and new item (D) has been revised to prevent this.

Public Input No. 451-NFPA 99-2015 [New Section after 5.1.13.4]

5.1.13.3.6 Hospital Grade (Non-Medical) Air

Add section for hospital grade air for the purposes of scope cleaning, equipment blow down, door seals, etc.

This would be for systems utilizing compressors that operate at less than 200 psig and are unique to "instrument air."

Statement of Problem and Substantiation for Public Input

There is a need for guidance utilizing systems that are for non-medical purposes. There are many uses for this "hospital grade" air and there are no requirements for these systems.

Submitter Information Verification

Submitter Full Name: JONATHAN WILLARD
Organization: ACUTE MEDICAL GAS SERVICES
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 14:23:18 EDT 2015

Committee Statement

Resolution: No specific suggestion for language was provided in the public input. The committee is open to the idea of addressing this issue if more substantial suggestions come back in the comment stage.

Public Input No. 56-NFPA 99-2015 [New Section after 5.1.13.7]

5.1.13.7 Line Pressure Control. Instrument air systems shall be provided with means to control line pressure at the source with at least the following characteristics:

(1) able to maintain stable pressures within the limits of Table 5.1.11, and

(2) able to flow 100% of the peak calculated demand, and

(3) redundant, such that each component of the control mechanism can be isolated for service or replacement while maintaining normal operation, and

(4) protected against overpressure (see 5.1.3.5.6), and

(5) be constructed of materials deemed suitable for the service by the manufacturer.which can provide for:

Statement of Problem and Substantiation for Public Input

The original justification for the 200 psi compressor was based on using classic pressure regulators to ensure a 185 psi line pressure. As regulators inevitably have some pressure drop, the pressure needed to drive the regulators had to be higher. This reasoning no longer pertains, as technologies now exist which can control the pressure by means other than pressure regulation, and not all facilities wish to operate their instrument air at 185 psi.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 54-NFPA 99-2015 [Section No. 5.1.13.3.5.3]	

Submitter Information Verification

Submitter Full Name: Mark Allen
Organization: Beacon Medaes
Street Address:
City:
State:
Zip:
Submittal Date: Thu Apr 09 15:59:35 EDT 2015

Committee Statement

Resolution: FR-670-NFPA 99-2015
Statement: The original justification for the 200 psi compressor was based on using classic pressure regulators to ensure a 185 psi line pressure. As regulators inevitably have some pressure drop, the pressure needed to drive the regulators had to be higher. This reasoning no longer pertains, as technologies now exist which can control the pressure by means other than pressure regulation, and not all facilities wish to operate their instrument air at 185 psi.

Public Input No. 68-NFPA 99-2015 [Section No. 5.1.14.2.2.5(B)]

(B)

Appropriate qualification shall be demonstrated by any of the following:

(1) A documented training program acceptable to the health care facility by which such persons are employed or contracted to work with specific equipment as installed in that facility

(2) Credentialing to the requirements of ASSE 6040, *Professional Qualification Standard for Medical Gas Maintenance Personnel*, and technically competent on the specific equipment as installed in that facility.

(3) Credentialing to the requirements of ASSE 6030, *Professional Qualification Standard for Medical Gas Systems Verifiers* , and technically competent on the specific equipment as installed in that facility.

Statement of Problem and Substantiation for Public Input

to better define maintenance requirements for personnel

Submitter Information Verification

Submitter Full Name: John Gregory
Organization: HDR Architecture Inc.
Affilliation: PIPE Medical Gas Committee Phoenix, AZ
Street Address:
City:
State:
Zip:
Submittal Date: Wed Apr 15 15:49:39 EDT 2015

Committee Statement

Resolution: The language shown in the PI is identical to the current language in the 2015 edition.

Public Input No. 144-NFPA 99-2015 [Section No. 5.1.14.4.7]

5.1.14.4.7

Procedures, as specified, shall be established for the following:

(1) Maintenance program for the medical air compressor supply system in accordance with the manufacturer's recommendations

(2) Facility testing and calibration procedure that ensures carbon monoxide monitors are calibrated at least annually or more often if recommended by the manufacturer

(3) Maintenance program for both the medical–surgical vacuum piping system and the secondary equipment attached to medical–surgical vacuum station inlets to ensure the continued good performance of the entire medical–surgical vacuum system

(4) Maintenance program for the WAGD system to ensure performance

(5) Facility testing and calibration procedure that ensures that oxygen concentration monitors are calibrated at least every three (3) months or more often if recommended by the manufacturer,

(6) Where oxygen sources include concentrator units, maintenance programs for the oxygen concentrator units and all essential subcomponents.

Statement of Problem and Substantiation for Public Input

These changes are needed to support the concentrators

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 135-NFPA 99-2015 [New Section after 5.1.3.8.5]	Parent

Submitter Information Verification

Submitter Full Name: MARK ALLEN
Organization: BEACON MEDAES
Street Address:
City:
State:
Zip:
Submittal Date: Mon May 25 12:24:00 EDT 2015

Committee Statement

Resolution: FR-671-NFPA 99-2015
Statement: These changes are needed to support the concentrators by adding maintenance requirements to ensure their continued safe use once in service.

Public Input No. 145-NFPA 99-2015 [New Section after 5.1.14.4.9]

5.1.14.4.10

When Oxygen Supply System Using Concentrators are used, and one or more of the three sources is a cylinder header the facility shall establish procedures to ensure the facility is always provided with an average 12 hour of oxygen in reserve, as follows:

(1) the facility shall establish a minimum cylinder pressure which will permit an average 12 hour supply. That value will be included as part of the standard operating procedure for the oxygen supply system,

(2) the cylinders shall be inspected daily and any loss of pressure noted,

(3) when the cylinders are found to have lost pressure, due to use or leakage and thus are below the pre-established pressure, the cylinders shall be exchanged.

Statement of Problem and Substantiation for Public Input

These changes are needed to support concentrators when cylinders are used as reserves

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 135-NFPA 99-2015 [New Section after 5.1.3.8.5]	Parent

Submitter Information Verification

Submitter Full Name: MARK ALLEN
Organization: BEACON MEDAES
Street Address:
City:
State:
Zip:
Submittal Date: Mon May 25 12:25:46 EDT 2015

Committee Statement

Resolution: FR-672-NFPA 99-2015
Statement: These changes are needed to support concentrators when cylinders are used as reserves by adding important maintenance requirements.

Public Input No. 146-NFPA 99-2015 [New Section after 5.2.3.5]

5.2.3.6 Oxygen Supply System Using Concentrators shall be permitted to consist of two sources, one of which shall be a cylinder header with sufficient cylinder connections for an average 8 hour supply.

Statement of Problem and Substantiation for Public Input

These changes are needed to support the concentrators if used in Category 2 facilities, and follows the precedent of a less redundant system.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 135-NFPA 99-2015 [New Section after 5.1.3.8.5]	Parent

Submitter Information Verification

Submitter Full Name: MARK ALLEN
Organization: BEACON MEDAES
Street Address:
City:
State:
Zip:
Submittal Date: Mon May 25 12:27:36 EDT 2015

Committee Statement

Resolution: FR-673-NFPA 99-2015
Statement: These changes are needed to support the concentrators if used in Category 2 facilities, and follows the precedent of a less redundant system.

Public Input No. 436-NFPA 99-2015 [Section No. 5.3]

5.3* Category 3 ~~Piped Gas and Vacuum~~ Systems.

5.3.1* Applicability.

These requirements shall apply to health care facilities that qualify to install Category 3 systems as defined in Chapter 4.

5.3.1.1

The following sections of this chapter shall apply to the operation, management, and maintenance of the medical gas and vacuum systems in both new and existing Category 3 health care facilities:

(1) 5.3.1.2(1)

(2) 5.3.1.6

(3) 5.3.2

(4) 5.3.4.1(4)

(5) 5.3.3.3.2

(6) 5.3.3.3.3

(7) 5.3.3.3.4

(8) 5.3.3.3.5

(9) 5.3.3.3.6

(10) 5.3.3.3.7

(11) 5.3.3.4(4)

(12) 5.3.14

5.3.1.2

Category 3 piped gas and vacuum systems shall be permitted when all of the following criteria are met:

(1) * Only moderate sedation; minimal sedation, as defined in 3.3.61.3 and 3.3.61.4; or no sedation is performed. Deep sedation and general anesthesia shall not be permitted.

(2) The loss of the piped gas and vacuum systems is not likely to cause injury to patients, staff, or visitors, but can cause discomfort.

(3) The facility piped gas and vacuum systems are intended for Category 3 or Category 4 patient care rooms per 3.3.127.3 and 3.3.127.4.

5.3.1.3

Where the term *medical gas* occurs, the provisions shall apply to all piped systems for oxygen, nitrous oxide, medical air, carbon dioxide, helium, air, and mixtures thereof. Wherever the name of a specific gas service occurs, the provision shall apply only to that gas.

5.3.1.4

Where the term *medical support gas* occurs, the provisions shall apply to all piped systems for nitrogen and dental air. Wherever the name of a specific gas service occurs, the provision shall apply only to that gas.

5.3.1.5

Wherever the term *vacuum* occurs, the provisions shall apply to all piped systems for medical–surgical vacuum, waste anesthetic gas disposal (WAGD), and dental vacuum. Wherever the name of a specific vacuum service occurs, the provision shall apply only to that vacuum service.

5.3.1.6

An existing system that is not in strict compliance with the requirements of this code shall be permitted to continue in use as long as the authority having jurisdiction has determined that such use does not constitute a distinct hazard to life.

5.3.2 Nature of Hazards of Gas and Vacuum Systems.

Potential fire and explosion hazards associated with Category 3 gas and dental vacuum systems shall be considered in the design, installation, testing, operation, and maintenance of the systems.

5.3.3 Sources.

Category 3 systems shall comply with 5.2.3, except as included in 5.3.3.1 through 5.3.3.11.

5.3.3.1 Central Supply System Identification and Labeling.

Category 3 systems shall comply with 5.2.3.1.

5.3.3.2 Central Supply Operations.

Category 3 systems shall comply with 5.2.3.2.

5.3.3.3 Central Supply System Locations.

Category 3 systems shall comply with 5.2.3.3.

5.3.3.3.1

Ventilation for motor-driven equipment, including dental air sources and dental vacuum sources, shall comply with 5.2.3.3.

5.3.3.3.2

Enclosures shall serve no purpose other than to contain the medical gas source equipment, except that nitrogen source equipment and dental air cylinders in 5.3.3.6.1 shall be permitted in the enclosure.

5.3.3.3.3

Dental air compressors, dental vacuum pumps, and other equipment shall not be located in enclosures for medical gas cylinders.

5.3.3.3.4

Dental air compressors shall be installed in a designated mechanical equipment area, heated and ventilated in accordance with 5.2.3.3, and have required utilities (e.g., electrical power, drains, lighting).

5.3.3.3.5

Where nitrogen or dental air in cylinders is used, the cylinders shall be permitted to be located in a dental air compressor equipment room.

5.3.3.3.6

Nitrogen and dental air cylinders shall be permitted to be located in enclosures for medical gases.

5.3.3.3.7

Cylinders in service and in storage shall be individually secured and located to prevent falling or being knocked over.

5.3.3.4 Central Supply Systems.

Category 3 systems, including dental air sources and dental vacuum sources shall comply with 5.2.3.4 except as follows:

(1) The central supply system's final line regulators shall be permitted to be simplex.

(2) For a single treatment facility, the central supply system shall contain a minimum of two equal headers, of one or more cylinders, with each header containing a minimum of an average day's supply.

(3) Where the central supply system is remote from the building being served, the manifold in this category shall include an automatic means of alternating the primary and secondary headers.

(4) Where the central supply system is not remote, the manifold in this category shall include a manual or automatic means of alternating the primary and secondary headers.

(5) Where the central supply system serves multiple treatment facilities, the manifold in this category shall include an automatic means of alternating the primary and secondary headers.

(6) For dental applications, flexible connectors of other than all-metal construction that connect manifolds to the gas distribution piping shall not exceed 1.52 m (5 ft) in length and shall not penetrate walls, floors, ceilings, or partitions.

(7) Pressure relief valve discharge that will not create an oxygen deficient atmosphere hazard shall be permitted to exhaust inside the manifold room.

5.3.3.5 Category 3 Medical Air Supply Systems.

Category 3 medical air supply systems shall comply with 5.2.3.5.

5.3.3.6* Dental Air Supply Systems.

Dental air supply systems shall comply with 5.3.3.6.1 or 5.3.3.6.2.

5.3.3.6.1 Dental Air Compressor Supply Systems.

5.3.3.6.1.1 General.

Category 3 dental air compressor supply systems shall include the following:

(1) Disconnect switch(es)

(2) Motor starting device(s)

(3) Motor overload protection device(s)

(4) One or more compressors

(5) For single, duplex, or multiple compressor systems, means for activation/deactivation of each individual compressor

(6) When multiple compressors are used, manual or automatic means to alternate individual compressors

(7) When multiple compressors are used, manual or automatic means to activate the additional unit(s) should the in-service unit(s) be incapable of maintaining adequate pressure

(8) Intake filter–muffler(s) of the dry type

(9) Receiver(s) with a manual or automatic drain

(10) Shutoff valves

(11) Compressor discharge check valve(s) (for multiple compressors)

(12) Air dryer(s) that maintains a minimum of 40 percent relative humidity at operating pressure and temperature

(13) In-line final particulate/coalescing filters rated at 0.01 µ, with filter status indicator to ensure the delivery of dental air with a maximum allowable 0.05 ppm liquid oil

(14) Pressure regulator(s)

(15) Pressure relief valve

(16) Pressure indicator

(17) Moisture indicator

5.3.3.6.1.2 Receivers.

Receivers shall have the following:

(1) The capacity to prevent short cycling of the compressor(s)

(2) Compliance with Section VIII, “Unfired Pressure Vessels,” of the ASME *Boiler and Pressure Vessel Code*

5.3.3.6.1.3* Moisture Indicator.

Moisture indicators shall have the following:

(1) A location in the active airstream prior to, or after, the receiver and upstream of any system pressure regulators

(2) The ability to indicate (e.g., by color change, digital readout, or other method understood by the user) when the relative humidity of the dental air exceeds 40 percent at line pressure and temperature

5.3.3.6.1.4 Pressure Relief Valve Discharge.

Pressure relief valves for dental air systems having less than 84,950 L (3000 ft^3) at STP shall be permitted to discharge locally indoors in a safe manner that will not restrict the flow.

5.3.3.6.1.5* Source of Dental Air Compressor Intake.

Dental air sources for a compressor(s) shall meet the following requirements:

(1) If the intake is located inside the building, it shall be located within a space where no chemical-based materials are stored or used.

(2) If the intake is located inside the building, it shall be located in a space that is not used for patient medical treatment.

(3) If the intake is located inside the building, it shall not be taken from a room or space in which there is an open or semi-open discharge from a Category 3 vacuum system.

(4) If the intake is located outside the building, it shall be drawn from locations where no contamination from vacuum exhaust discharges or particulate matter is anticipated.

5.3.3.6.2 Dental Air Cylinder Supply Systems.

5.3.3.6.2.1 Quality of Dental Air Cylinder.

Dental air cylinders shall meet or exceed the quality grade requirements of industrial air.

5.3.3.6.2.2

Dental air cylinders shall be permitted to be installed in enclosures for Category 3 medical gases or in a mechanical room.

5.3.3.6.2.3

Dental air cylinder source equipment shall include the following:

(1) One or more cylinders of dental air, each providing at least an average day's supply

(2) A manifold if primary and secondary cylinders are provided

(3) A line pressure regulating valve

(4) A check valve downstream from the pressure regulating valve

(5) A pressure relief valve set at 50 percent above the normal line pressure and located downstream from the check valve

5.3.3.6.2.4

Mechanical means shall be provided to ensure that the dental air cylinder gas source equipment is connected to the correct gas distribution piping system.

5.3.3.6.2.5

Threaded connections to manifolds shall comply with the mandatory requirements of CGA V-5, *Diameter-Index Safety System (Noninterchangeable Low Pressure Connections for Medical Gas Applications)*.

5.3.3.6.2.6

Flexible connectors shall have a gauge pressure rating not less than 6895 kPa (1000 psi).

5.3.3.6.2.7

Flexible connectors of other than all-metal construction that connect manifolds to the gas distribution piping shall not exceed 1.52 m (5 ft) in length and shall not penetrate walls, floors, ceilings, or partitions.

5.3.3.6.2.8

Pressure relief valves for dental air cylinder systems having less than 84,950 L (3000 ft^3) at STP shall be permitted to discharge locally indoors in a safe manner that will not restrict the flow.

5.3.3.7 Instrument Air Supply Systems.

A Category 3 instrument air supply system, if used, shall comply with 5.2.3.8, except that instrument air supply system compressors, dryers, aftercoolers, filters, and regulators shall be permitted to be simplex.

5.3.3.8* Nitrogen Supply System.

Nitrogen source equipment shall be permitted to be installed in enclosures for Category 3 medical gases or in a mechanical room.

5.3.3.8.1

Nitrogen source equipment shall include the following:

(1) One or more cylinders of nitrogen NF, each providing at least an average day's supply

(2) A manifold, if primary and secondary cylinders are provided

(3) A line pressure regulating valve

(4) A check valve downstream from the pressure regulating valve

(5) A pressure relief valve set at 50 percent above the normal line pressure and located downstream from the check valve

(6) A pressure relief valve discharge piped to outdoors at a point that will not create a probable hazard and that is turned down to prevent the entry of rain or snow

5.3.3.8.2

Flexible connectors of other than all-metal construction that connect manifolds to the gas distribution piping shall not exceed 1.52 m (5 ft) in length and shall not penetrate walls, floors, ceilings, or partitions.

5.3.3.9 Medical–Surgical Vacuum.

Category 3 medical–surgical vacuum systems, if used, shall comply with 5.2.3.5.

5.3.3.10 Dental Vacuum Supply Systems.

5.3.3.10.1 Category 3 Dental Vacuum Supply Systems.

5.3.3.10.1.1

Category 3 vacuum sources shall include the following:

(1) A vacuum pump(s) suited for wet or dry service as intended in the system design

(2) If intended for wet service, properly vented liquid/air separator

5.3.3.10.1.2

Category 3 vacuum source equipment shall be obtained from, and be installed under the supervision of, the manufacturer(s) or supplier(s) who is familiar with its installation, operation, and use.

5.3.3.10.1.3* Drainage from Vacuum Equipment.

Drainage from vacuum equipment shall include the following:

(1) Liquids drained from a Category 3 vacuum source shall discharge indirectly to a sanitary drainage system through an approved air gap to a trapped and vented drain.

(2) The clear air gap between a vacuum drain outlet or indirect drain pipe, and the flood category rim of an indirect waste receptor or other point of disposal, shall be not less than twice the diameter of the effective opening of the drain served, but not less than 25.4 mm (1 in.), unless the local plumbing code requires a larger air gap.

(3) Where the drainage is from a waste holding tank on the suction side of the vacuum source, the following requirements shall be met:

(4) A check valve shall be installed in the drain line from the holding tank between the tank and any vent lines.

(5) The trap in the building drainage system shall be the deep-seal type that is conventionally vented within the plumbing system.

(6) An additional vent shall be installed between the holding tank drain check valve and the drain trap, on the inlet side of the trap, to close and seal the check valve while the holding tank is operating under vacuum and collecting waste.

(7) The additional vent described in 5.3.3.10.1.3(3)(c) shall be permitted to be connected to the plumbing system vents, unless a drain pump system with a positive pressure discharge is installed, in which case 5.3.3.10.1.3(4) shall apply.

(8) Both of the vents in 5.3.3.10.1.3(3)(c) and 5.3.3.10.1.3(3)(d) shall extend vertically to not less than 152 mm (6 in.) above the top of the holding tank before turning horizontal.

(9) Outdoor vents shall be protected against the entry of insects, vermin, debris, and precipitation.

(10) The trap and drain branch shall be not less than two pipe sizes larger than the waste pipe from the separator, but not less than DN50 (NPS 2).

(11) The trap seal shall be not less than 100 mm (4 in.) deep.

(12) The vent for the vacuum check valve shall be not less than the size of the check valve.

(13) The vent for the trap shall be not less than one-half the size of the trap and drain branch.

(14)* Where the drainage is from a waste holding tank on the suction side of the vacuum source and a positive discharge pump drain system is in place, the following requirements shall be met:

(15) The pump shall drain indirectly to the plumbing system through an air gap equal to the diameter of the discharge pipe but not less than 25.4 mm (1 in.) above the rim.

(16) A check valve shall be installed in the drain line from the holding tank to the drain.

(17) The trap in the building drainage system shall be the deep seal type that is conventionally vented within the plumbing system.

(18) The trap and drain branch shall be not less than two pipe sizes larger than the waste pipe from the separator, but not less than DN40 (NPS 1 1/2).

(19) The trap seal shall be at least two times the exhaust back pressure in the separator but not less than 100 mm (4 in.) deep.

(20) Where the drainage is at a positive pressure from an air/waste separator on the discharge side of the vacuum source, the following requirements shall be met:

(21) Where there is a positive pressure discharge from a vacuum pump, it shall be required to drain through an air/waste separator.

(22) Discharge shall be either of the following:

(23) Direct into a trap in the building drainage system that is the deep-seal type and is conventionally vented within the plumbing system

(24) Indirect to the plumbing system through an air gap equal to the diameter of the discharge pipe, but not less than 25.4 mm (1 in.) above the rim

(25) The trap vent shall extend vertically to not less than 152 mm (6 in.) above the top of the separator before turning horizontal.

(26) Outdoor vents shall be protected against the entry of insects, vermin, debris, and precipitation.

(27) The trap and drain branch shall be two pipe sizes larger than the waste pipe from the separator, but not less than DN40 (NPS 1 1/2).

(28) The air/waste separator vent shall be the full size of the separator vent connection.

(29) The separator vent shall be separate from the building vent piping.

(30) The indirect drainage from vacuum equipment shall discharge to the sanitary drainage system through an approved air gap without causing overflow or splatter on building surfaces.

(31) None of the requirements within this chapter for drainage in Category 3 dental vacuum systems shall supersede provisions of the local plumbing code.

5.3.3.10.1.4 Vacuum Exhaust.

The exhaust from Category 3 vacuum sources shall comply with the following:

(1) It shall be piped to the outside through a separate vent system.

(2) The exhaust point shall be chosen to minimize the hazards of noise.

(3) The exhaust point shall be remote from any door, window, or other opening into the building.

(4) The exhaust point shall be located at a different elevation than air intakes.

(5) The exhaust point shall not be located where affected by prevailing winds, adjacent buildings, topography, or other obstacles to the rapid dispersion of the exhaust gases.

(6) The exhaust point shall be protected against the entry of insects, vermin, debris, and precipitation.

(7) The exhaust piping shall be sized to prevent back pressure greater than the pump manufacturer's recommendations.

(8) * Where multiple pumps exhaust through a common pipe, each pump shall be fitted with a check valve or a manual isolation valve or shall be arranged to allow capping the individual pump exhausts when a pump is removed for service.

(9) Where multiple pumps exhaust through a common pipe, piping shall be arranged following the pump manufacturer's recommendations.

5.3.3.11 Waste Anesthetic Gas Disposal (WAGD).

Category 3 systems shall comply with 5.2.3.7.

5.3.4 Valves.

5.3.4.1 Emergency Shutoff Valves.

Category 3 systems shall comply with 5.2.4, except as follows:

(1) * Where a central Category 3 medical gas supply is remote from a single treatment facility, the main supply line shall be provided with an emergency shutoff valve so located in the single treatment facility to be accessible from all use-point locations in an emergency.

(2) Where a central Category 3 medical gas supply system supplies two treatment facilities, each facility shall be provided with an emergency shutoff valve so located in the treatment facility to be accessible from all use-point locations in an emergency.

(3) Emergency shutoff valves shall be labeled to indicate the gas they control and shall shut off only the gas to the treatment facility that they serve.

(4) A remotely activated shutoff valve at a supply manifold shall not be used for emergency shutoff. For clinical purposes, such a remote valve actuator shall not fail-closed in the event of a loss of electric power. Where remote actuators are the type that fail-open, it shall be mandatory that cylinder shutoff valves be closed whenever the system is not in use.

5.3.5* Station Outlets and Inlets.

Category 3 systems shall comply with 5.2.5.

5.3.6 Manufactured Assemblies.

Category 3 systems shall comply with 5.2.6.

5.3.7 Surface-Mounted Medical Gas Rails.

Category 3 systems shall comply with 5.2.7.

5.3.8 Pressure and Vacuum Indicators.

Category 3 systems shall comply with 5.2.8.

5.3.9 Category 3 Warning Systems.

Category 3 warning systems shall comply with 5.2.9 except as follows:

(1) Warning systems shall be permitted to be a single alarm panel.

(2) The alarm panel shall be located in an area of continuous surveillance while the facility is in operation.

(3) Pressure and vacuum switches/sensors shall be mounted at the source equipment with a pressure indicator at the master alarm panel.

(4) Warning systems for medical gas systems shall provide the following alarms:

(5) _ Oxygen main line pressure low

(6) _ Oxygen main line pressure high

(7) _ Oxygen changeover to secondary bank or about to changeover (if automatic)

(8) _ Nitrous oxide main line pressure low

(9) _ Nitrous oxide main line pressure high

(10) _ Nitrous oxide changeover to secondary bank or about to changeover (if automatic)

(11) Audible and noncancelable alarm visual signals shall indicate if the pressure in the main line increases or decreases 20 percent from the normal operating pressure.

(12) Visual indications shall remain until the situation that caused the alarm is resolved.

(13) Pressure switches/sensors shall be installed downstream of any emergency shutoff valves and any other shutoff valves in the system and shall cause an alarm for the medical gas if the pressure decreases or increases 20 percent from the normal operating pressure.

(14) A cancelable audible indication of each alarm condition that produces a sound at the alarm panel shall reinitiate the audible signal if another alarm condition occurs while the audible signal is silenced.

5.3.10 Distribution.

Category 3 systems shall comply with 5.1.10, except as follows:

(1) Dental air and dental vacuum shall comply with 5.1.10.2.1, except the tubing shall be permitted to be annealed (soft temper).

(2) Dental vacuum tubing shall be permitted to be:

(3) PVC plastic pipe shall be Schedule 40 or Schedule 80, complying with ASTM D 1785, *Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120*.

(4) PVC plastic fittings shall be Schedule 40 or Schedule 80 to match the pipe, complying with ASTM D 2466, *Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40*; or ASTM D 2467, *Standard Specification Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80*.

(5) Joints in PVC plastic piping shall be solvent-cemented in accordance with ASTM D 2672, *Standard Specification for Joints for IPS PVC Pipe Using Solvent Cement*.

(6) CPVC IPS plastic pipe shall be Schedule 40 or Schedule 80, complying with ASTM F 441, *Standard Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe*, Schedules 40 and 80.

(7) CPVC IPS plastic fittings shall be Schedule 40 or Schedule 80 to match the pipe, complying with ASTM F 438, *Standard Specification for Socket-Type Chlorinated Poly (Vinyl Chlorinated) (CPVC) Plastic Pipe Fittings, Schedule 40*; or ASTM F 439, *Standard Specification for Chlorinated Poly (Vinyl Chlorinated) (CPVC) Plastic Pipe Fittings, Schedule 80*.

(8) CPVC CTS plastic pipe and fittings 1/2 in. through 2 in. size shall be SDR 11, complying with ASTM D 2846, *Standard Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Hot- and Cold-Water Distribution Systems*.

(9) Solvent cement for joints in CPVC plastic piping shall comply with ASTM F 493, *Solvent Cements for CPVC Pipe and Fittings*.

(10) Dental air and dental vacuum fittings shall be permitted to be:

(11) Soldered complying with ASME B16.22, *Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings*

(12) Flared fittings complying with ASME B16.26, *Cast Copper Alloy Fittings for Flared Copper Tubes*

(13) Compression fittings (3/4 in. maximum size)

(14) Soldered joints in Category 3 dental air supply piping shall be made in accordance with ASTM B 828, *Standard Practice for Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings*, using a “lead-free” solder filler metal containing not more than 0.2 percent lead by volume that complies with ASTM B 32, *Standard Specification for Solder Metal*.

(15) Where required, gas and vacuum equipment and piping shall be seismically restrained against earthquakes in accordance with the applicable building code.

(16) Gas and vacuum piping systems shall be designed and sized to deliver the required flow rates at the utilized pressures.

5.3.10.1 Installation of Vacuum Piping.

5.3.10.1.1 Pipe Sizing.

Piping systems shall be designed and sized to draw the required flow rates at the utilization vacuums.

5.3.10.1.2 Protection of Piping.

5.3.10.1.2.1

Piping shall be protected against freezing, corrosion, and physical damage.

5.3.10.1.2.2

Piping exposed in corridors and other locations where subject to physical damage from the movement of carts, stretchers, beds, portable equipment, or vehicles, shall be protected.

5.3.10.1.3 Copper Pipe Support.

Pipe support for copper tube shall be in accordance with Table 5.3.10.1.3.

Table 5.3.10.1.3 Maximum Copper Tube Support Spacing

Pipe Size	Hanger Spacing	
	mm	ft
DN8 (NPS ¼) (⅜ in. O.D.)	1520	5
DN10 (NPS ⅜) (½ in. O.D.)	1830	6
DN15 (NPS ½) (⅝ in. O.D.)	1830	6
DN20 (NPS ¾) (⅞ in. O.D.)	2130	7
DN25 (NPS 1) (1 ⅛ in. O.D.)	2440	8
DN32 (NPS 1 ¼) (1 ⅜ in. O.D.)	2740	9
DN40 (NPS 1 ½) (1 ⅝ in. O.D.) and larger	3050	10
Vertical risers, all sizes, every floor, but not to exceed	4570	15

5.3.10.1.4 Plastic Pipe Support.

The maximum support spacing for plastic pipe shall be in accordance with Table 5.3.10.1.4.

Table 5.3.10.1.4 Maximum Plastic Pipe Support Spacing

Pipe Size	Hanger Spacing	
	mm	ft
DN15 (NPS ½) (⅝ in. O.D.)	1220	4.00
DN20 (NPS ¾) (⅞ in. O.D.)	1220	4.00
DN25 (NPS 1) (1 ⅛ in. O.D.)	1320	4.33
DN32 (NPS 1 ¼) (1 ⅜ in. O.D.)	1320	4.33
DN40 (NPS 1 ½) (1 ⅝ in. O.D.)	1420	4.66
DN50 (NPS 2) (2 ⅜ in. O.D.)	1420	4.66
DN65 (NPS 2 ½) (2 ⅞ in. O.D.) and larger	1520	5.00
Vertical risers, all sizes, every floor, but not to exceed	3040	10.00

5.3.10.1.5 Underground Piping Outside of Buildings.

Buried piping outside of buildings shall be in accordance with 5.1.10.11.5.

5.3.10.1.6 Underground Piping Within Buildings.

Underground piping within buildings shall be in accordance with the following:

(1) The installation procedure for underground piping shall prevent physical damage to the piping while being backfilled

(2) If the underground piping is protected by a conduit, cover, or other enclosure, access shall be provided at the joints during construction for visual inspection and leak testing

5.3.10.1.7 Piping Within Floor Slabs.

5.3.10.1.7.1

Copper Category 3 vacuum piping that is installed within floor slabs shall be enclosed in a conduit, flexible plastic tubing, or other means to prevent contact between the copper tubing and concrete.

5.3.10.1.7.2

Plastic Category 3 vacuum piping shall be permitted to contact concrete.

5.3.10.1.7.3

During construction, access shall be provided at all joints for visual inspection and leak testing.

5.3.10.1.7.4

Care shall be taken to protect plastic piping from damage from vibrators while wet concrete is being consolidated.

5.3.10.1.8 Plastic Pipe Installation.

5.3.10.1.8.1

Horizontal piping in Category 3 dental vacuum systems shall be sloped a minimum of 7 mm per 3.05 m (¼ in. per 10 ft) toward the vacuum source equipment.

5.3.10.1.8.2

Horizontal piping shall include no sags or low points that will permit fluids or debris to accumulate.

5.3.10.1.9 Valves in Vacuum Systems.

Shutoff valves shall be permitted to be installed in Category 3 vacuum piping.

5.3.11 Labeling, Pressure, and Identification.

Category 3 systems shall comply with 5.2.11.

5.3.12 Performance Criteria and Testing.

Category 3 systems for medical gas, medical support gas, medical surgical vacuum, WAGD, dental air and dental vacuum shall comply with 5.2.12, except as follows:

5.3.12.1 General.

5.3.12.1.1

The initial tests required by 5.3.12.1 shall be performed prior to the final tests required by 5.3.12.2.10.

5.3.12.1.2

Initial tests shall be conducted by one or more of the following, who shall be experienced in the installation, operation, and testing of Category 3 medical support gas, dental vacuum, dental air and dental vacuum supply systems:

(1) Installer

(2) Representative of the system supplier

(3) Representative of the system manufacturer

(4) ASSE 6030 medical gas system's verifier

5.3.12.1.3

The test gas for Category 3 copper piping supply systems shall be oil-free, dry nitrogen NF or the system gas.

5.3.12.1.4

Where manufactured assemblies are to be installed, the initial tests required under 5.3.12.2 shall be performed as follows:

(1) After completion of the distribution piping

(2) Prior to installation or connection of manufactured assemblies having internal tubing or hose.

(3) At all outlets and inlets on manufactured assemblies having internal copper tubing

5.3.12.2 Category 3 Dental Vacuum Supply Systems.

5.3.12.2.1 Blowdown.

Piping in Category 3 gas-powered device supply systems shall be blown clear using oil-free, dry nitrogen NF as follows:

(1) After installation of the distribution piping

(2) After installation of outlet shutoff valves

(3) Before connection to the use points

(4) Before installation of system components (e.g., pressure indicators, pressure relief valves, manifolds, source equipment)

5.3.12.2.2 Initial Pressure Test for Copper Piping Systems.

5.3.12.2.3

Each section of the piping in Category 3 gas powered device supply systems, copper vacuum systems, shall be pressure tested using oil-free, dry nitrogen NF or the system gas.

5.3.12.2.4

Initial pressure tests shall be conducted as follows:

(1) After blowdown of the distribution piping

(2) After installation of outlet and inlet shutoff valves station outlets and inlets

(3) Prior to the installation of components of the distribution piping system that would be damaged by the test pressure (e.g., pressure/vacuum indicators, line pressure relief valves)

(4) The source shutoff valves for the piping systems shall remain closed during the tests, unless being used for the pressure test gas

(5) With test pressure 1.5 times the system operating pressure but not less than a gauge pressure of 1035 kPa (150 psi)

(6) * With test pressure maintained until each joint is examined for leakage by means of a detectant that is safe for use with oxygen and that does not contain ammonia

(7) With leaks, if any, located, repaired (if permitted), or replaced (if required) by the installer and retested

5.3.12.2.5 Initial Leak Test for Plastic Vacuum Piping Systems.

Initial leak tests shall be conducted as follows:

(1) Each section of the piping in Category 3 vacuum systems with plastic piping shall be leak tested using a test vacuum or the vacuum source equipment.

(2) If installed, the vacuum source shutoff valves for the piping systems shall remain closed during the tests, unless being used for the leak test vacuum source.

(3) The leak test vacuum shall be a minimum of 300 mm (12 in.) HgV.

(4) The test vacuum shall be maintained until each joint has been examined for leakage. An ultrasonic leak detector shall be permitted to be used.

(5) Leaks, if any, shall be located, repaired, or replaced (if required) by the installer and retested.

5.3.12.2.6 Initial Cross-Connection Test for Copper Piping Systems.

Initial cross-connection tests for copper piping systems shall be conducted as follows:

(1) Tests shall be conducted to determine that no cross-connections exist between the Category 3 copper piping systems and Category 3 copper vacuum piping systems.

(2) The piping systems shall be at atmospheric pressure.

(3) The test gas shall be oil-free, dry nitrogen NF or dental air.

(4) The source of test gas shall be connected only to the piping system being tested.

(5) The piping system being tested shall be pressurized to a gauge pressure of 345 kPa (50 psi).

(6) The individual system gas outlet and vacuum inlet in each installed gas-powered device and copper vacuum or copper piping system shall be checked to determine that the test gas pressure is present only at the piping system being tested.

(7) The cross-connection test shall be repeated for each installed Category 3 piping system for gas-powered devices and for vacuum with copper piping.

(8) The proper labeling and identification of system outlets/inlets shall be confirmed during the tests.

5.3.12.2.7 Initial Cross-Connection Test for Plastic Vacuum Piping Systems.

Initial cross-connection tests for plastic vacuum piping systems shall be conducted as follows:

(1) Tests shall be conducted to determine that no cross connections exist between any Category 3 plastic vacuum piping systems or Category 3 copper piping systems

(2) The vacuum source shutoff valves for the vacuum piping systems shall remain closed during the tests, unless they are being used for the cross-connection test vacuum source.

(3) The cross-connection test vacuum shall be a minimum of 300 mm (12 in.) HgV.

(4) The source of test vacuum shall be connected only to the vacuum piping system being tested.

(5) The individual gas-powered device system gas outlets and vacuum system inlets shall be checked to determine that the test vacuum is only present at the vacuum piping system being tested.

(6) The cross-connection tests shall be repeated for each installed vacuum system with plastic piping.

(7) The proper labeling and identification of system outlets/inlets shall be confirmed during the tests.

5.3.12.2.8 Initial Piping Purge Test for Dental Air and Nitrogen Supply Systems.

Initial piping purge tests for dental air and nitrogen supply systems shall be conducted as follows:

(1) The outlets in each Category 3 dental air and nitrogen supply piping system shall be purged to remove any particulate matter from the distribution piping.

(2) The test gas shall be oil-free, dry nitrogen NF or the system gas.

(3) Each outlet shall be purged with an intermittent high-volume flow of test gas until the purge produces no discoloration in a clean white cloth.

(4) The purging shall be started at the furthest outlet in the system and proceed toward the source equipment.

5.3.12.2.9 Initial Standing Pressure Test for Dental Air and Nitrogen Supply Systems.

After successful completion of the initial pressure tests under 5.3.12.2.6, Category 3 gas-powered device distribution piping shall be subjected to a standing pressure test, which includes the following:

(1) Tests shall be conducted after the installation of outlet valves and other distribution system components (e.g., pressure indicators and line pressure relief valves).

(2) The source valve shall be closed unless the source gas is being used for the test.

(3) The piping systems shall be subjected to a 24-hour standing pressure test using oil-free, dry nitrogen NF or the system gas.

(4) Test pressures shall be 20 percent above the normal system operating line pressure.

(5) At the conclusion of the tests, there shall be no change in the test pressure greater than a gauge pressure of 35 kPa (5 psi).

(6) Leaks, if any, shall be located, repaired (unless prohibited), or replaced (if required) by the installer and retested.

5.3.12.2.10 Final Testing of Category 3 Dental Air Supply Systems, Nitrogen Supply Systems, and Vacuum Systems.

Final testing of dental air supply systems, nitrogen supply systems, and vacuum systems shall be conducted as follows:

(1) Final testing of gas-powered device systems and vacuum systems shall be performed only after all initial tests required by 5.3.12.2.1 through 5.3.12.2.9 have been performed.

(2) The final tests required by 5.3.12.2.11 through 5.3.12.2.15 shall be performed by one or more of the following, who shall be experienced with the installation, operation, and testing of Category 3 gas-powered device supply systems and vacuum systems:

(3) _ Installer

(4) _ Representative of the system supplier

(5) _ Representative of the system manufacturer

(6) _ ASSE 6030 medical gas system's verifier

(7) The test gas shall be oil-free, dry nitrogen NF or the system gas or vacuum.

5.3.12.2.11 Final Standing Pressure Test (Category 3 Dental Air and Nitrogen).

Each gas-powered device piping system shall be subjected to a 10-minute standing pressure test at operating line pressure using the following procedures:

(1) After the system is filled with oil-free, dry nitrogen NF or the system gas, the source valve shall be closed.

(2) The piping system downstream of the valve shall show no decrease in pressure after 10 minutes.

(3) Any leaks found shall be located, repaired (unless prohibited) or replaced (if required) by the installer, and retested.

5.3.12.2.12 Final Standing Vacuum Test (Category 3 Vacuum Systems).

Each Category 3 vacuum piping system shall be subjected to a 10-minute standing vacuum test at operating line vacuum using the following procedures:

(1) After the system has stabilized at the operating line vacuum, the source valve and any zone valves shall be closed.

(2) The piping system upstream of the valves shall show no decrease in vacuum after 10 minutes.

(3) Leaks, if any, shall be located, repaired (unless prohibited) or replaced (if required) by the installer, and retested.

5.3.12.2.13 Final Cross-Connection Test (Category 3 Gas-Powered Devices and Vacuum and Scavenging Systems).

After closing of walls and completion of the requirements of 5.3.12.2, it shall be determined that no cross-connections exist between the piping systems for Category 3 gas-powered devices and vacuum and scavenging systems using the following method:

(1) Test each piping system independently, starting with the vacuum systems first, and check that the test vacuum is present only at inlets of the system being tested.

(2) Reduce all piping systems to atmospheric pressure.

(3) Operate the Category 3 vacuum or scavenging system being tested at the normal system vacuum, using the source equipment.

(4) Test each gas outlet and vacuum inlet using appropriate adapters to verify that vacuum is present only at the vacuum inlets in the system being tested, and not at any gas outlets or inlets.

(5) Shut down the vacuum source equipment and slowly break the vacuum in the vacuum piping system, increasing its pressure to atmospheric.

(6) Test each Category 3 vacuum system until all are determined to be free of cross-connections.

(7) Using oil-free, dry nitrogen NF or the system gas, pressurize the gas piping system to a gauge pressure of 345 kPa (50 psi).

(8) Test each gas-powered device gas outlet using appropriate adapters to verify that the test gas pressure is present only at the outlets in the gas-powered device system being tested.

(9) After it has been determined that a gas-powered device piping system is free of cross-connections, disconnect the source of test gas and reduce the piping to atmospheric pressure.

(10) Proceed to test each gas-powered device piping system until all are determined to be free of cross-connections.

5.3.12.2.14 Final Piping Purge Test (Category 3 Gas-Powered Devices).

To remove any traces of particulate matter deposited in the pipelines as a result of construction, a heavy, intermittent purging of each gas-powered device pipeline shall be done.

(1) The appropriate adapter shall be obtained from the facility or manufacturer, and high purge rates shall be put on each outlet.

(2) After the purge is started, it shall be rapidly interrupted several times until the purge produces no discoloration in a white cloth loosely held over the adapter during the purge.

(3) To avoid possible damage to the outlet and its components, the test shall not be conducted using any implement other than the correct adapter.

5.3.12.2.15 Final Tie-In Test (Category 3 Dental Air, Nitrogen, and Vacuum Systems).

(1) Prior to the connection of any new piping in extensions or additions to an existing piping system, the final tests in 5.3.12.2 shall be successfully performed on the new work.

(2) Each joint in the final connection between the new work and the existing system shall be leak-tested, with the gas of system designation or vacuum at the normal operating pressure or vacuum, by means of a leak detectant that is safe for use with oxygen and does not contain ammonia.

(3) For gas piping, immediately after a final connection is made and leak-tested, the specific altered zone and components in the immediate zone or area that is downstream from the point or area of intrusion shall be purged per 5.3.12.2.14.

5.3.12.2.16 Source Equipment Testing (Category 3 Dental Air, Nitrogen, and Vacuum Systems).

Source equipment testing shall be conducted as follows:

(1) Source equipment checks shall be performed following the installation of the interconnecting pipelines, accessories, and source equipment.

(2) Where the source equipment and system gas or vacuum is used for testing of the distribution piping, the source equipment shall be checked out and placed in operation prior to testing the distribution piping.

(3) The source equipment shall be checked out and placed in operation according to the manufacturer's instructions.

5.3.13 Reserved.

5.3.14 Operation and Management of Category 3 Systems.

Category 3 systems shall comply with 5.2.14.

Statement of Problem and Substantiation for Public Input

This is placeholder for the Task Group #3 discussion.

Submitter Information Verification

Submitter Full Name: JONATHAN WILLARD
Organization: ACUTE MEDICAL GAS SERVICES
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 13:15:59 EDT 2015

Committee Statement

Resolution: CI-648-NFPA 99-2015

Statement: This committee input is provided to solicit public comment on the idea of reverting section 5.3 from the 2015 edition language back to the 2012 edition language (with some modifications) for the 2018 edition.

Alternatively, this also suggests creating a new chapter specific for dental facilities including their piped gas requirements while maintaining a Category 3 in Chapter 5 similar to what is in the 2015.

Some of the reasons for this include: Category 3 now includes moderate sedation while 2012 limited the scope to minimal sedation.

The introduction of medical gasses other than oxygen/nitrous oxide have opened the door for treatment that would render the patients incapable of self-preservation.

Category 3 facilities typically do not have AHJ's, physical facility maintenance personnel, or facility supervisors of any kind on staff. As a result, the current Cat. 3 opens the door for procedures using deeper levels of sedation to be administered in small facilities, i.e. Dental Offices.

Public Input No. 164-NFPA 99-2015 [Section No. 5.3.3.4]

5.3.3.4 Central Supply Systems.

Category 3 systems, including dental air sources and dental vacuum sources shall comply with 5.2.3.4 except as follows:

(1) The central supply system's final line regulators shall be permitted to be simplex.

(2) For a single treatment facility, the central supply system shall contain a minimum of two equal headers, of one or more cylinders, with each header containing a minimum of an average day's supply.

(3) Where the central supply system is remote from the building being served, the manifold in this category shall include an automatic means of alternating the primary and secondary headers.

(4) Where the central supply system is not remote, the manifold in this category shall include a manual or automatic means of alternating the primary and secondary headers.

(5) Where the central supply system serves multiple treatment facilities, the manifold in this category shall include an automatic means of alternating the primary and secondary headers.

(6) For dental applications, flexible connectors of other than all-metal construction that connect manifolds to the gas distribution piping shall not exceed 1.52 m (5 ft) in length and shall not penetrate walls, floors, ceilings, or partitions. ***[This 5 foot maximum length requirement only shows up in Category 3] [It should either be mirrored to what is in Category 1 5.1.3.5.10 (2) (Headers) or limited to say only as long as necessary as outlined in Cat 1 Flexible connectors. 5.1.10.11.6.1]. I believe both Cat 1 and Cat 3 should read the same for cylinder leads.***

(7) Pressure relief valve discharge that will not create an oxygen deficient atmosphere hazard shall be permitted to exhaust inside the manifold room.

Statement of Problem and Substantiation for Public Input

There is no maximum length requirement in Category 1 cylinder connecting tails. Cat 1 and Cat 3 should both list a maximum length.

Submitter Information Verification

Submitter Full Name: HANS DALKE
Organization: PLUMBERS LOCAL UNION 27
Affilliation: Medical Gas Instructor Plumbers Local Union #27
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 03 17:22:07 EDT 2015

Committee Statement

Resolution: CI-648-NFPA 99-2015

Statement: This committee input is provided to solicit public comment on the idea of reverting section 5.3 from the 2015 edition language back to the 2012 edition language (with some modifications) for the 2018 edition.

Alternatively, this also suggests creating a new chapter specific for dental facilities including their piped gas requirements while maintaining a Category 3 in Chapter 5 similar to what is in the 2015.

Some of the reasons for this include: Category 3 now includes moderate sedation while 2012 limited the scope to minimal sedation.

The introduction of medical gasses other than oxygen/nitrous oxide have opened the door for treatment that would render the patients incapable of self-preservation.

Category 3 facilities typically do not have AHJ's, physical facility maintenance personnel, or facility supervisors of any kind on staff. As a result, the current Cat. 3 opens the door for procedures using deeper levels of sedation to be administered in small facilities, i.e. Dental Offices.

Public Input No. 241-NFPA 99-2015 [Section No. 5.3.3.4]

5.3.3.4 Central Supply Systems.

Category 3 systems, including dental air sources and dental vacuum sources shall comply with 5.2.3.4 except as follows:

(1) The central supply system's final line regulators shall be permitted to be simplex.

(2) For a single treatment facility, the central supply system shall contain a minimum of two equal headers, of one or more cylinders, with each header containing a minimum of an average day's supply.

(3) Where the central supply system is remote from ~~the building being~~ the single treatment facility being served, the manifold in this category shall include an automatic means of alternating the primary and secondary headers.

(4) Where the central supply system is not remote, the manifold in this category shall include a manual or automatic means of alternating the primary and secondary headers.

(5) Where the central supply system serves multiple treatment facilities, the manifold in this category shall include an automatic means of alternating the primary and secondary headers.

(6) For dental applications, flexible connectors of other than all-metal construction that connect manifolds to the gas distribution piping shall not exceed 1.52 m (5 ft) in length and shall not penetrate walls, floors, ceilings, or partitions.

(7) Pressure relief valve discharge that will not create an oxygen deficient atmosphere hazard shall be permitted to exhaust inside the manifold room.

Statement of Problem and Substantiation for Public Input

There may be many different occupancies in the building. The proposed wording matches that in 5.3.4.1 Emergency Shutoff Valves.

Submitter Information Verification

Submitter Full Name: CORKY BISHOP
Organization: AIRGAS USA LLC
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 24 17:34:35 EDT 2015

Committee Statement

Resolution: CI-648-NFPA 99-2015

Statement: This committee input is provided to solicit public comment on the idea of reverting section 5.3 from the 2015 edition language back to the 2012 edition language (with some modifications) for the 2018 edition.

Alternatively, this also suggests creating a new chapter specific for dental facilities including their piped gas requirements while maintaining a Category 3 in Chapter 5 similar to what is in the 2015.

Some of the reasons for this include: Category 3 now includes moderate sedation while 2012 limited the scope to minimal sedation.

The introduction of medical gasses other than oxygen/nitrous oxide have opened the door for treatment that would render the patients incapable of self-preservation.

Category 3 facilities typically do not have AHJ's, physical facility maintenance personnel, or facility supervisors of any kind on staff. As a result, the current Cat. 3 opens the door for procedures using deeper levels of sedation to be administered in small facilities, i.e. Dental Offices.

Public Input No. 348-NFPA 99-2015 [Section No. 5.3.3.4]

5.3.3.4 Central Supply Systems.

Category 3 systems, including dental air sources and dental vacuum sources shall comply with 5.2.3.4 except as follows:

(1) The central supply system's final line regulators shall be permitted to be simplex.

(2) For a single treatment facility, the central supply system shall contain a minimum of two equal headers, of one or more cylinders, with each header containing a minimum of an average day's supply.

(3) Where the central supply system is remote from the building being served, the manifold in this category shall include an automatic means of alternating the primary and secondary headers.

(4) Where the central supply system is not remote, the manifold in this category shall include a manual or automatic means of alternating the primary and secondary headers.

(5) Where the central supply system serves multiple treatment facilities, the manifold in this category shall include an automatic means of alternating the primary and secondary headers.

(6) For dental applications, flexible connectors of other than all-metal construction that connect manifolds to the gas distribution piping shall not exceed 1.52 m (5 ft) in length and shall not penetrate walls, floors, ceilings, or partitions.

(7) Pressure relief valve discharge that will not create an oxygen deficient or an oxygen enriched atmosphere hazard shall be permitted to exhaust inside the manifold room.

Statement of Problem and Substantiation for Public Input

An oxygen manifold (or oxygen / nitrous oxide combination manifold) should not have the relief valves vented to the room. This could create an oxygen enriched atmosphere, which may assist in or lead to a fire or explosion event.

Submitter Information Verification

Submitter Full Name: JONATHAN WILLARD
Organization: ACUTE MEDICAL GAS SERVICES
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jul 05 10:31:39 EDT 2015

Committee Statement

Resolution: CI-648-NFPA 99-2015

Statement: This committee input is provided to solicit public comment on the idea of reverting section 5.3 from the 2015 edition language back to the 2012 edition language (with some modifications) for the 2018 edition.

Alternatively, this also suggests creating a new chapter specific for dental facilities including their piped gas requirements while maintaining a Category 3 in Chapter 5 similar to what is in the 2015.

Some of the reasons for this include: Category 3 now includes moderate sedation while 2012 limited the scope to minimal sedation.

The introduction of medical gasses other than oxygen/nitrous oxide have opened the door for treatment that would render the patients incapable of self-preservation.

Category 3 facilities typically do not have AHJ's, physical facility maintenance personnel, or facility supervisors of any kind on staff. As a result, the current Cat. 3 opens the door for procedures using deeper levels of sedation to be administered in small facilities, i.e. Dental Offices.

Public Input No. 434-NFPA 99-2015 [Section No. 5.3.3.6.1.3]

5.3.3.6.1.3* Moisture Indicator.

Moisture indicators shall have the following:

(1) A location in the active airstream prior to, or after, the receiver and upstream of any system pressure regulators

(2) The ability to indicate (e.g., by color change, digital readout, or other method understood by the user) when the relative humidity of the dental air exceeds ~~40 percent~~ ? percent at line pressure and temperature

Statement of Problem and Substantiation for Public Input

This is a placeholder for the Task Group #1 discussion.

Submitter Information Verification

Submitter Full Name: JONATHAN WILLARD
Organization: ACUTE MEDICAL GAS SERVICES
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 13:11:29 EDT 2015

Committee Statement

Resolution: CI-648-NFPA 99-2015

Statement: This committee input is provided to solicit public comment on the idea of reverting section 5.3 from the 2015 edition language back to the 2012 edition language (with some modifications) for the 2018 edition.

Alternatively, this also suggests creating a new chapter specific for dental facilities including their piped gas requirements while maintaining a Category 3 in Chapter 5 similar to what is in the 2015.

Some of the reasons for this include: Category 3 now includes moderate sedation while 2012 limited the scope to minimal sedation.

The introduction of medical gasses other than oxygen/nitrous oxide have opened the door for treatment that would render the patients incapable of self-preservation.

Category 3 facilities typically do not have AHJ's, physical facility maintenance personnel, or facility supervisors of any kind on staff. As a result, the current Cat. 3 opens the door for procedures using deeper levels of sedation to be administered in small facilities, i.e. Dental Offices.

Public Input No. 242-NFPA 99-2015 [Section No. 5.3.3.9]

5.3.3.9 Medical–Surgical Vacuum.

Category 3 medical–surgical vacuum systems, if used, shall comply with 5.2.3. ~~5~~ 6 .

Statement of Problem and Substantiation for Public Input

Editorial. Paragraph 5 refers to Medical Air systems.

Submitter Information Verification

Submitter Full Name: CORKY BISHOP
Organization: AIRGAS USA LLC
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 24 17:47:20 EDT 2015

Committee Statement

Resolution: CI-648-NFPA 99-2015

Statement: This committee input is provided to solicit public comment on the idea of reverting section 5.3 from the 2015 edition language back to the 2012 edition language (with some modifications) for the 2018 edition.

Alternatively, this also suggests creating a new chapter specific for dental facilities including their piped gas requirements while maintaining a Category 3 in Chapter 5 similar to what is in the 2015.

Some of the reasons for this include: Category 3 now includes moderate sedation while 2012 limited the scope to minimal sedation.

The introduction of medical gasses other than oxygen/nitrous oxide have opened the door for treatment that would render the patients incapable of self-preservation.

Category 3 facilities typically do not have AHJ's, physical facility maintenance personnel, or facility supervisors of any kind on staff. As a result, the current Cat. 3 opens the door for procedures using deeper levels of sedation to be administered in small facilities, i.e. Dental Offices.

Public Input No. 243-NFPA 99-2015 [Section No. 5.3.9]

5.3.9 Category 3 Warning Systems.

Category 3 warning systems shall comply with 5.2.9 except as follows:

(1) Warning systems shall be permitted to be a single alarm panel.

(2) The alarm panel shall be located in an area of continuous surveillance while the facility is in operation.

(3) Pressure and vacuum switches/sensors shall be mounted at the source equipment with a high/low pressure ~~indicator~~ alarm indication at the master alarm panel.

(4) Warning systems for medical gas systems shall provide the following alarms:

(5) Oxygen main line pressure low

(6) Oxygen main line pressure high

(7) Oxygen changeover to secondary bank or about to changeover (if automatic)

(8) Nitrous oxide main line pressure low

(9) Nitrous oxide main line pressure high

(10) Nitrous oxide changeover to secondary bank or about to changeover (if automatic)

(11) Audible and noncancelable alarm visual signals shall indicate if the pressure in the main line increases or decreases 20 percent from the normal operating pressure.

(12) Visual indications shall remain until the situation that caused the alarm is resolved.

(13) Pressure switches/sensors shall be installed downstream of any emergency shutoff valves and any other shutoff valves in the system and shall cause an alarm for the medical gas if the pressure decreases or increases 20 percent from the normal operating pressure.

(14) A cancelable audible indication of each alarm condition that produces a sound at the alarm panel shall reinitiate the audible signal if another alarm condition occurs while the audible signal is silenced.

Additional Proposed Changes

File Name	Description	Approved
MVC-005S.JPG	Accutron Guardian alarm panel	

Statement of Problem and Substantiation for Public Input

Many category 3 alarm panels do not have gauges on them. The attached picture of an Accutron Guardian manifold has indicators for high and low pressure and changeover.

Submitter Information Verification

Submitter Full Name: CORKY BISHOP
Organization: AIRGAS USA LLC
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 24 17:52:00 EDT 2015

Committee Statement

Resolution: CI-648-NFPA 99-2015

Statement: This committee input is provided to solicit public comment on the idea of reverting section 5.3 from the 2015 edition language back to the 2012 edition language (with some modifications) for the 2018 edition.

Alternatively, this also suggests creating a new chapter specific for dental facilities including their piped gas requirements while maintaining a Category 3 in Chapter 5 similar to what is in the 2015.

Some of the reasons for this include: Category 3 now includes moderate sedation while 2012 limited the scope to minimal sedation.

The introduction of medical gasses other than oxygen/nitrous oxide have opened the door for treatment that would render the patients incapable of self-preservation.

Category 3 facilities typically do not have AHJ's, physical facility maintenance personnel, or facility supervisors of any kind on staff. As a result, the current Cat. 3 opens the door for procedures using deeper levels of sedation to be administered in small facilities, i.e. Dental Offices.

Public Input No. 244-NFPA 99-2015 [Section No. 5.3.10 [Excluding any Sub-Sections]]

Category 3 systems shall comply with 5.1.10, except as follows:

(1) Dental air and dental vacuum shall comply with 5.1.10.2.1, except the tubing shall be permitted to be annealed (soft temper).

(2) Dental vacuum tubing shall be permitted to be:

(3) PVC plastic pipe shall be Schedule 40 or Schedule 80, complying with ASTM D 1785, *Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120*.

(4) PVC plastic fittings shall be Schedule 40 or Schedule 80 to match the pipe, complying with ASTM D 2466, *Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40*; or ASTM D 2467, *Standard Specification Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80*.

(5) Joints in PVC plastic piping shall be solvent-cemented in accordance with ASTM D 2672, *Standard Specification for Joints for IPS PVC Pipe Using Solvent Cement*.

(6) CPVC IPS plastic pipe shall be Schedule 40 or Schedule 80, complying with ASTM F 441, *Standard Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe*, Schedules 40 and 80.

(7) CPVC IPS plastic fittings shall be Schedule 40 or Schedule 80 to match the pipe, complying with ASTM F 438, *Standard Specification for Socket-Type Chlorinated Poly (Vinyl Chlorinated) (CPVC) Plastic Pipe Fittings, Schedule 40*; or ASTM F 439, *Standard Specification for Chlorinated Poly (Vinyl Chlorinated) (CPVC) Plastic Pipe Fittings, Schedule 80*.

(8) CPVC CTS plastic pipe and fittings 1/2 in. through 2 in. size shall be SDR 11, complying with ASTM D 2846, *Standard Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Hot- and Cold-Water Distribution Systems*.

(9) Solvent cement for joints in CPVC plastic piping shall comply with ASTM F 493, *Solvent Cements for CPVC Pipe and Fittings*.

(10) Dental air and dental vacuum fittings shall be permitted to be:

(11) Brazed or Soldered complying with ASME B16.22, *Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings*

(12) Flared fittings complying with ASME B16.26, *Cast Copper Alloy Fittings for Flared Copper Tubes*

(13) Compression fittings (3/4 in. maximum size)

(14) Soldered joints in Category 3 dental air supply piping shall be made in accordance with ASTM B 828, *Standard Practice for Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings*, using a “lead-free” solder filler metal containing not more than 0.2 percent lead by volume that complies with ASTM B 32, *Standard Specification for Solder Metal*.

(15) Where required, gas and vacuum equipment and piping shall be seismically restrained against earthquakes in accordance with the applicable building code.

(16) Gas and vacuum piping systems shall be designed and sized to deliver the required flow rates at the utilized pressures.

Statement of Problem and Substantiation for Public Input

Add brazing as an accepted technique for joining Dental Air and Dental Vacuum fittings. This was previously allowed in NFPA 99, 2012; 5.3.7.2.3.1.

Submitter Information Verification

Submitter Full Name: CORKY BISHOP
Organization: AIRGAS USA LLC
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 24 18:26:24 EDT 2015

Committee Statement

Resolution: CI-648-NFPA 99-2015

Statement: This committee input is provided to solicit public comment on the idea of reverting section 5.3 from the 2015 edition language back to the 2012 edition language (with some modifications) for the 2018 edition.

Alternatively, this also suggests creating a new chapter specific for dental facilities including their piped gas requirements while maintaining a Category 3 in Chapter 5 similar to what is in the 2015.

Some of the reasons for this include: Category 3 now includes moderate sedation while 2012 limited the scope to minimal sedation.

The introduction of medical gasses other than oxygen/nitrous oxide have opened the door for treatment that would render the patients incapable of self-preservation.

Category 3 facilities typically do not have AHJ's, physical facility maintenance personnel, or facility supervisors of any kind on staff. As a result, the current Cat. 3 opens the door for procedures using deeper levels of sedation to be administered in small facilities, i.e. Dental Offices.

Public Input No. 245-NFPA 99-2015 [Section No. 5.3.12.1.2]

5.3.12.1.2

Initial tests shall be conducted by one or more of the following, who shall be experienced in the installation, operation, and testing of Category 3 medical support gas, ~~dental vacuum, dental~~ dental air and dental vacuum supply systems:

(1) Installer

(2) Representative of the system supplier

(3) Representative of the system manufacturer

(4) ASSE 6030 medical gas system's verifier

Statement of Problem and Substantiation for Public Input

Dental vacuum was listed twice.

Submitter Information Verification

Submitter Full Name: CORKY BISHOP
Organization: AIRGAS USA LLC
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 24 18:32:51 EDT 2015

Committee Statement

Resolution: CI-648-NFPA 99-2015

Statement: This committee input is provided to solicit public comment on the idea of reverting section 5.3 from the 2015 edition language back to the 2012 edition language (with some modifications) for the 2018 edition.

Alternatively, this also suggests creating a new chapter specific for dental facilities including their piped gas requirements while maintaining a Category 3 in Chapter 5 similar to what is in the 2015.

Some of the reasons for this include: Category 3 now includes moderate sedation while 2012 limited the scope to minimal sedation.

The introduction of medical gasses other than oxygen/nitrous oxide have opened the door for treatment that would render the patients incapable of self-preservation.

Category 3 facilities typically do not have AHJ's, physical facility maintenance personnel, or facility supervisors of any kind on staff. As a result, the current Cat. 3 opens the door for procedures using deeper levels of sedation to be administered in small facilities, i.e. Dental Offices.

Public Input No. 246-NFPA 99-2015 [Section No. 5.3.12.2.8]

5.3.12.2.8 Initial Piping Purge Test for Dental Air and Nitrogen Supply Systems.

Initial piping purge tests for dental air and nitrogen supply systems shall be conducted as follows:

(1) The outlets in each Category 3 dental air and nitrogen supply piping system shall be purged to remove any particulate matter from the distribution piping.

(2) The test gas shall be oil-free, dry nitrogen NF or the system gas.

(3) Each outlet shall be purged with an intermittent high-volume flow of test gas until the purge produces no discoloration in a clean white cloth.

(4) The purging shall be started at the ~~furthest~~ closest outlet in the system and ~~proceed toward the~~ proceed away from the source equipment.

Statement of Problem and Substantiation for Public Input

Particulate must be swept away from the source to the end outlet. This matches the procedure in 5.1.12.2.5.2.

Submitter Information Verification

Submitter Full Name: CORKY BISHOP
Organization: AIRGAS USA LLC
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 24 18:35:58 EDT 2015

Committee Statement

Resolution: CI-648-NFPA 99-2015
Statement: This committee input is provided to solicit public comment on the idea of reverting section 5.3 from the 2015 edition language back to the 2012 edition language (with some modifications) for the 2018 edition.

Alternatively, this also suggests creating a new chapter specific for dental facilities including their piped gas requirements while maintaining a Category 3 in Chapter 5 similar to what is in the 2015.

Some of the reasons for this include: Category 3 now includes moderate sedation while 2012 limited the scope to minimal sedation.

The introduction of medical gasses other than oxygen/nitrous oxide have opened the door for treatment that would render the patients incapable of self-preservation.

Category 3 facilities typically do not have AHJ's, physical facility maintenance personnel, or facility supervisors of any kind on staff. As a result, the current Cat. 3 opens the door for procedures using deeper levels of sedation to be administered in small facilities, i.e. Dental Offices.

Public Input No. 247-NFPA 99-2015 [Section No. 5.3.12.2.9]

5.3.12.2.9 Initial Standing Pressure Test for Dental Air and Nitrogen Supply Systems.

After successful completion of the initial pressure tests under 5.3.12.2.~~6~~ 2 , Category 3 gas-powered device distribution piping shall be subjected to a standing pressure test, which includes the following:

(1) Tests shall be conducted after the installation of outlet valves and other distribution system components (e.g., pressure indicators and line pressure relief valves).

(2) The source valve shall be closed unless the source gas is being used for the test.

(3) The piping systems shall be subjected to a 24-hour standing pressure test using oil-free, dry nitrogen NF or the system gas.

(4) Test pressures shall be 20 percent above the normal system operating line pressure.

(5) At the conclusion of the tests, there shall be no change in the test pressure greater than a gauge pressure of 35 kPa (5 psi).

(6) Leaks, if any, shall be located, repaired (unless prohibited), or replaced (if required) by the installer and retested.

Statement of Problem and Substantiation for Public Input

Editorial. Paragraph 2 is the Initial Pressure Test for Copper Piping.

Submitter Information Verification

Submitter Full Name: CORKY BISHOP
Organization: AIRGAS USA LLC
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 24 18:40:28 EDT 2015

Committee Statement

Resolution: CI-648-NFPA 99-2015

Statement: This committee input is provided to solicit public comment on the idea of reverting section 5.3 from the 2015 edition language back to the 2012 edition language (with some modifications) for the 2018 edition.

Alternatively, this also suggests creating a new chapter specific for dental facilities including their piped gas requirements while maintaining a Category 3 in Chapter 5 similar to what is in the 2015.

Some of the reasons for this include: Category 3 now includes moderate sedation while 2012 limited the scope to minimal sedation.

The introduction of medical gasses other than oxygen/nitrous oxide have opened the door for treatment that would render the patients incapable of self-preservation.

Category 3 facilities typically do not have AHJ's, physical facility maintenance personnel, or facility supervisors of any kind on staff. As a result, the current Cat. 3 opens the door for procedures using deeper levels of sedation to be administered in small facilities, i.e. Dental Offices.

Public Input No. 377-NFPA 99-2015 [New Section after 5.3.14]

5.4.1 Category 4 Piped Gas and Vacuum Systems

Bring back the requirements for laboratory gas and vacuum systems installed in health care facilities. There is a TG working on these requirements.

Statement of Problem and Substantiation for Public Input

Bring back the requirements for laboratory gas and vacuum systems in health care facilities. There is a TG working on this. There is currently no guidance for these systems.

Submitter Information Verification

Submitter Full Name: JONATHAN WILLARD
Organization: ACUTE MEDICAL GAS SERVICES
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jul 05 12:27:51 EDT 2015

Committee Statement

Resolution: CI-674-NFPA 99-2015
Statement: This committee input has been created to propose the concept of bringing back the requirements for lab gases from the 2005 edition of NFPA 99. Ideally this will be resolved through dealing with the NFPA 45 committee and ensuring that the requirements for piped lab gases are kept within that document. If there is resistance, then it may be best to place this back in Chapter 5.

Public Input No. 314-NFPA 99-2015 [Section No. 6.1.2]

6.1.2

The following paragraphs of this chapter shall apply to new and existing health care facilities:

(1) 6.3.2.2. 1.2

(2) 6.3.2.2. 4.2

(3) 6.3.2.2.6.1

(4) 6.3.2.2.6.2(F)

(5) 6.3.2.2.8.5(B) (2)and (3)

(6) 6.3.2.2.8.7

(7) 6.3.4

(8) 6.4.1.1.18.7

(9) 6.4.2.2.6.2(C)

(10) 6.4.2.2.6.3

(11) 6.4.4

(12) 6.5.4

Statement of Problem and Substantiation for Public Input

There are existing medical facilities built before 1990 that have operating rooms (Category 1 spaces) with no receptacles circuits originating directly from a normal power distribution system panel, but only circuits originating from critical branch panels served by the same critical branch automatic transfer switch. This violates the intent of NFPA-76A, NFPA-99 and NFPA-70, and creates a single point of failure. If all branch circuits in an operating room/space are served with critical power, then the critical branch panels serving the operating room/space must be served from separate critical branch automatic transfer switches.

Submitter Information Verification

Submitter Full Name: JAMES MEADE
Organization:
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jul 02 14:00:18 EDT 2015

Committee Statement

Resolution: This is a design consideration that may not have been required for all facilities at the time of installation. Design and performance requirements should not be listed in the retroactive section.

Public Input No. 378-NFPA 99-2015 [Section No. 6.1.2]

6.1.2

The following paragraphs of this chapter shall apply to new and existing health care facilities:

(1) 6.3.2.2.4.2
(2) 6.3.2.2.6.1
(3) 6.3.2.2.6.2(F)
(4) 6.3.2.2.8 ~~.5(B) (2)and (3)~~
(5) 6.3.2.2.8.7
(6) 6.3.4
(7) 6.4.1.1.18.7
(8) 6.4.2.2.6.2(C)
(9) 6.4.2.2.6.3
(10) 6.4.4
(11) 6.5.4

Statement of Problem and Substantiation for Public Input

Wet Procedure Locations have been recognized as hazardous locations requiring special protection for workers and patients for some time. The hazards of using electricity in areas where water is present as a matter of operations is well documented. OSHA requires construction to provide ground fault circuit interrupter protection for personnel. Articles 553, 555, and 680 of the National Electrical Code provide increased protections for Floating Buildings, Marinas and Boatyards, and Swimming Pools, Fountains and Similar Installations – all of which acknowledge and mitigate the special hazards associated with the use of line voltage electricity in a wet environment. These well-documented hazards imposed on hospital personnel and patients in health care facilities are not somehow abated because of the age of the building. Workers and patients should not be exposed to the hazards of line voltage electricity in a wet procedure location. When one considers these hazards can be mitigated with low cost, proven technology, such as ground fault circuit interrupters; it becomes prudent and right to provide proven protection for all Wet Procedure Locations found in any Health Care Facility.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 376-NFPA 99-2015 [Section No. 6.3.2.2.8.5]	

Submitter Information Verification

Submitter Full Name: STEPHEN LIPSTER
Organization: THE ELECTRICAL TRADES CENTER
Affilliation: IBEW
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jul 05 12:32:25 EDT 2015

Committee Statement

Resolution: This is a design consideration that may not have been required for all facilities at the time of installation. Design and performance requirements should not be listed in the retroactive section. For PI 376, section 6.3.2.2.8.5 allows a means for existing facilities to manage wet procedure locations where protection against ground fault was not provided in the original construction.

Public Input No. 416-NFPA 99-2015 [Section No. 6.1.2]

6.1.2

The following paragraphs of this chapter shall apply to new and existing health care facilities:

(1) 6.3.2.2.4.2
(2) 6.3.2.2.6.1
(3) 6.3.2.2.6.2(F)
(4) 6.3.2.2.8.5(B) (2)and (3)
(5) 6.3.2.2.8.7
(6) 6.3. 2.2.11.5
(7) 6.3. 4
(8) 6.4.1.1.18.7
(9) 6.4.2.2.6.2(C)
(10) 6.4.2.2.6.3
(11) 6.4.4
(12) 6.5.4

Statement of Problem and Substantiation for Public Input

Battery-powered lighting unit testing should be a retroactive requirement for existing facilities. The requirement in 6.3.2.2.11.5 is for monthly testing for 30 seconds and annual testing for 30 minutes. This is definitely a requirement that should apply to both new and existing facilities. Adding this requirement 6.1.2 makes it clear that this testing is required on existing facilities which is in line with testing requirements for other similar battery lighting systems as outlined in NFPA 70.

Submitter Information Verification

Submitter Full Name: CHRIS FINEN
Organization: EATON CORPORATION
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 11:13:08 EDT 2015

Committee Statement

Resolution: FR-3-NFPA 99-2015
Statement: Battery-powered lighting unit testing should be a retroactive requirement for existing facilities. The requirement in 6.3.2.2.11.5 is for monthly testing for 30 seconds and annual testing for 30 minutes. This is definitely a requirement that should apply to both new and existing facilities. Adding this requirement 6.1.2 makes it clear that this testing is required on existing facilities which is in line with testing requirements for other similar battery lighting systems as outlined in NFPA 70.

Public Input No. 389-NFPA 99-2015 [New Section after 6.2.3]

TITLE OF NEW CONTENT

6.2.4 (NEW) Location of Essential Electrical System Components.

Essential electrical system components shall be located to minimize interruptions caused by natural forces common to the area (e.g., storms, floods, earthquakes, or hazards created by adjoining structures or activities). Installations of electrical services shall be located to reduce possible interruption of normal electrical services resulting from similar causes as well as possible disruption of normal electrical service due to internal wiring and equipment failures. Feeders shall be located to provide physical separation of the feeders of the alternate source and from the feeders of the normal electrical source to prevent possible simultaneous interruption

Statement of Problem and Substantiation for Public Input

Various recent Standards Council decisions have clearly established that NFPA 99, Health Care Facilities Code, is a performance code. These same Standards Council decisions have clearly established NFPA 70, National Electrical Code, as an installation code. This is consistent with each document's published scope. With this clear delineation established, NFPA 99, a performance code, cannot modify NFPA 70, an installation code. This modification cannot occur because NFPA 99, as a performance code, does not have jurisdiction over installation elements found in NFPA 70, or any other NFPA installation code. For this reason, certain elements of NFPA 70 must be written in NFPA 99.
NFPA 70: National Electrical Code 2014 517.35 (C) contains language similar to what is show above. This language should be contained in NFPA 99 as direction for location of essential electrical system components. This particular reference provides for design considerations protecting the essential electrical system that are critical for operation from both manmade and natural catastrophe.
Recent natural weather events in the United States have exposed a design weakness in some facilities where redundant power was affected by flooding or other disasters effects. This provision will provide a reminder to all that location of power systems and fuel sources must not be affected by these events.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 390-NFPA 99-2015 [New Section after A.6.1]	

Submitter Information Verification

Submitter Full Name: GARY BECKSTRAND
Organization: UTAH ELECTRICAL JATC
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jul 05 12:54:02 EDT 2015

Committee Statement

Resolution: FR-4-NFPA 99-2015

Statement: Various recent Standards Council decisions have clearly established that NFPA 99, Health Care Facilities Code, is a performance code. These same Standards Council decisions have clearly established NFPA 70, National Electrical Code, as an installation code. This is consistent with each document's published scope. With this clear delineation established, NFPA 99, a performance code, cannot modify NFPA 70, an installation code. This modification cannot occur because NFPA 99, as a performance code, does not have jurisdiction over installation elements found in NFPA 70, or any other NFPA installation code. For this re=ason, certain elements of NFPA 70 must be written in NFPA 99.

NFPA 70: National Electrical Code 2014 517.35 (C) contains language similar to what is show above. This language should be contained in NFPA 99 as direction for location of essential electrical system components. This particular reference provides for design considerations protecting the essential electrical system that are critical for operation from both manmade and natural catastrophe.

Recent natural weather events in the United States have exposed a design weakness in some facilities where redundant power was affected by flooding or other disasters effects. This provision will provide a reminder to all that location of power systems and fuel sources must not be affected by these events.

Public Input No. 472-NFPA 99-2015 [Section No. 6.3.1]

6.3.1 Sources.

Each health care appliance requiring electrical line power for operation shall be supported by power sources that provide power adequate for each service.

6.3.1.1 Power/Utility Company.

(Reserved)

6.3.1.2 On-Site Generator Set.

(Reserved)

6.3.1.3 Electrical design professionals shall design the electrical service to patient care areas with the understanding that the Essential Power *Distribution Syste* . *m* has the same potential for outages, faults, and overloads as Normal Power *Distribution Systems* . For these reasons, neither the electrical design professional, nor the medical staff, should ever consider a 'Red Receptacles' to be immune from outages, faults, or overloads

Statement of Problem and Substantiation for Public Input

A necessary design and operational consideration that could be placed here or carried into an annex or handbook item.

Submitter Information Verification

Submitter Full Name: MICHAEL ANTHONY
Organization: UNIVERSITY OF MICHIGAN & University of Michigan Hospitals (James R. Harvey)
Affilliation: IEEE Education & Healthcare Faciities Committee
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 16:03:32 EDT 2015

Committee Statement

Resolution: In accordance with 1.2, "the purpose of this code is to provide minimum requirements for the installation, inspection, testing, maintenance, performance, and safe practices for facilities, material, equipment, and appliances, including other hazards associated with the primary hazards." No enforceable minimum requirements are established by PI # 472. Furthermore, per 6.4.2.2.6.2(C) and 6.5.2.2.4.2, receptacles supplied from the life safety and critical branches are not necessarily identified solely by red color.

Public Input No. 447-NFPA 99-2015 [Section No. 6.3.2.2]

6.3.2.2 All Patient Care ~~Rooms.~~ Areas

6.3.2.2.1*

Branch circuit wiring 600 V or less shall comply with the requirements in 6.3.2.2.1.1 through 6.3.2.2.1.4.

6.3.2.2.1.1* Circuits.

(A)

Branch circuits serving a given patient bed location shall be fed from not more than one normal branch-circuit distribution panel.

(B)

When required, branch circuits serving a given patient bed location shall be permitted to be fed from more than one critical branch-circuit distribution panel.

6.3.2.2.1.2 Category 1 Spaces.

Category 1 spaces shall be served by circuits from a critical branch panel(s) served from a single automatic transfer switch and a minimum of one circuit served by the normal power distribution system or by a system originating from a second critical branch automatic transfer switch.

6.3.2.2.1.3 Access to Overcurrent Protective Devices.

(A)

Only authorized personnel shall have access to overcurrent protective devices serving Category 1 and Category 2 spaces.

(B)

Overcurrent protective devices serving Category 1 and Category 2 spaces shall not be permitted to be located in public access spaces.

(C)

Where used in locations such as in Category 1 spaces, isolated power panels shall be permitted in those locations.

6.3.2.2.1.4 Special-Purpose Outlets.

Branch circuits serving only special-purpose outlets or receptacles (e.g., portable X-ray receptacles) shall not be required to conform to the requirements of 6.3.2.2.1.2.

6.3.2.2.2

Grounding requirements shall comply with the requirements in 6.3.2.2.2.1 through 6.3.2.2.2.4.

6.3.2.2.2.1 Grounding Circuitry Integrity.

Grounding circuits and conductors in patient care spaces shall be installed in such a way that the continuity of other parts of those circuits cannot be interrupted nor the resistance raised above an acceptable level by the installation, removal, and replacement of any installed equipment, including power receptacles.

6.3.2.2.2.2 Reliability of Grounding.

The grounding conductor shall conform to *NFPA 70*, *National Electrical Code*.

6.3.2.2.2.3 Separate Grounding Conductor.

When existing construction does not have a separate grounding conductor, the continued use of the system shall be permitted, provided that it meets the performance requirements in 6.3.3.1.

6.3.2.2.2.4 Metal Receptacle Boxes.

Where metal receptacle boxes are used, the performance of the connection between the receptacle grounding terminal and the metal box shall be equivalent to the performance provided by copper wire no smaller than 12 AWG.

6.3.2.2.3* Grounding Interconnects.

In patient care spaces supplied by the normal distribution system and any branch of the essential electrical system, the grounding system of the normal distribution system and that of the essential electrical system shall be interconnected.

6.3.2.2.4 Protection Against Ground Faults.

6.3.2.2.4.1* Equipment Protection.

The main and downstream ground-fault protective devices (where required) shall be coordinated as required in 6.3.2.5.

6.3.2.2.4.2 Personnel Protection.

If used, ground-fault circuit interrupters (GFCIs) shall be listed.

6.3.2.2.5

Low-voltage wiring shall comply with either of the following:

(1) Fixed systems of 30 V (dc or ac rms) or less shall be permitted to be ungrounded, provided that the insulation between each ungrounded conductor and the primary circuit, which is supplied from a conventionally grounded distribution system, is the same protection as required for the primary voltage.

(2) A grounded low-voltage system shall be permitted, provided that load currents are not carried in the grounding conductors.

6.3.2.2.6 Receptacles.

6.3.2.2.6.1* Types of Receptacles.

(A)

Each power receptacle shall provide at least one separate, highly dependable grounding pole capable of maintaining low-contact resistance with its mating plug, despite electrical and mechanical abuse. The grounding terminal of each receptacle shall be connected to the reference grounding point by means of an insulated copper equipment grounding conductor.

(B)

Special receptacles, such as the following, shall be permitted:

(1) Four-pole units providing an extra pole for redundant grounding or ground continuity monitoring

(2) Locking-type receptacles

(3) Where required for reduction of electrical noise on the grounding circuit, receptacles in which the grounding terminals are purposely insulated from the receptacle yoke

(C)

All single, duplex, or quadruplex type receptacles, or any combination thereof, located at patent bed locations in Category 1 spaces shall be listed hospital grade.

6.3.2.2.6.2 Minimum Number of Receptacles.

The number of receptacles shall be determined by the intended use of the spaces in accordance with 6.3.2.2.6.2(A) through 6.3.2.2.6.2(F).

(A)

Receptacles for Patient Bed Locations in Category 2 Spaces. Each patient bed location shall be provided with a minimum of eight receptacles. They shall be permitted to be of the locking or nonlocking type, single, duplex, or quadruplex type, or any combination of the three. All receptacles shall be listed hospital grade.

(B)

Receptacles for Patient Bed Locations in Category 1 Spaces. Each patient bed location shall be provided with a minimum of 14 receptacles. They shall be permitted to be of the locking or nonlocking type, single, duplex, or quadruplex type, or any combination of the three. All receptacles shall be listed hospital grade.

(C)

Receptacles for Operating Rooms. Operating rooms shall be provided with a minimum of 36 receptacles. They shall be permitted to be of the locking or nonlocking type, single, duplex, or quadruplex type, or any combination of the three. All receptacles shall be listed hospital grade.

(D)

Receptacles for Bathrooms or Toilets. Receptacles shall not be required in bathrooms or toilet rooms.

(E)

Receptacles for Special Rooms. Receptacles shall not be required in rooms where medical requirements mandate otherwise (e.g., certain psychiatric, pediatric, or hydrotherapy rooms).

(F)

Designated Pediatric Locations. Receptacles that are located within the patient rooms, bathrooms, playrooms, and activity rooms of pediatric units or spaces with similar risk as determined by the governing body, other than nurseries, shall be listed tamper-resistant or shall employ a listed tamper-resistant cover.

6.3.2.2.6.3 Polarity of Receptacles.

Each receptacle shall be wired in accordance with *NFPA 70*, *National Electrical Code*, to ensure correct polarity.

6.3.2.2.6.4 Other Services Receptacles.

Receptacles provided for other services having different voltages, frequencies, or types on the same premises shall be of such design that attachment plugs and caps used in such receptacles cannot be connected to circuits of a different voltage, frequency, or type, but shall be interchangeable within each classification and rating required for two-wire, 125-V, single-phase ac service.

6.3.2.2.7 Special Grounding.

6.3.2.2.7.1* Use of Isolated Ground Receptacles.

(A)

An isolated ground receptacle, if used, shall not defeat the purposes of the safety features of the grounding systems detailed herein.

(B)

An isolated ground receptacle shall not be installed within a patient care vicinity.

6.3.2.2.7.2 Patient Equipment Grounding Point.

A patient equipment grounding point comprising one or more grounding terminals or jacks shall be permitted in an accessible location in the patient care vicinity.

6.3.2.2.7.3* Special Grounding in Patient Care Rooms.

In addition to the grounding required to meet the performance requirements of 6.3.3.1, additional grounding shall be permitted where special circumstances so dictate.

6.3.2.2.8 Wet Procedure Locations.

6.3.2.2.8.1*

Wet procedure locations shall be provided with special protection against electric shock.

6.3.2.2.8.2

This special protection shall be provided as follows:

(1) Power distribution system that inherently limits the possible ground-fault current due to a first fault to a low value, without interrupting the power supply

(2) Power distribution system in which the power supply is interrupted if the ground-fault current does, in fact, exceed the trip value of a Class A GFCI

6.3.2.2.8.3

Patient beds, toilets, bidets, and wash basins shall not be required to be considered wet procedure locations.

6.3.2.2.8.4*

Operating rooms shall be considered to be a wet procedure location, unless a risk assessment conducted by the health care governing body determines otherwise.

6.3.2.2.8.5

In existing construction, the requirements of 6.3.2.2.8.1 shall not be required when a written inspection procedure, acceptable to the authority having jurisdiction, is performed by a designated individual at the hospital to indicate that equipment grounding conductors for 120-V, single-phase, 15-A and 20-A receptacles; equipment connected by cord and plug; and fixed electrical equipment are installed and maintained in accordance with *NFPA 70*, *National Electrical Code*, and the applicable performance requirements of this chapter.

(A)

The procedure shall include electrical continuity tests of all required equipment, grounding conductors, and their connections.

(B)

Fixed receptacles, equipment connected by cord and plug, and fixed electrical equipment shall be tested as follows:

(1) When first installed

(2) Where there is evidence of damage

(3) After any repairs

6.3.2.2.8.6

The use of an isolated power system (IPS) shall be permitted as a protective means capable of limiting ground-fault current without power interruption. When installed, such a power system shall conform to the requirements of 6.3.2.6.

6.3.2.2.8.7*

Operating rooms defined as wet procedure locations shall be protected by either isolated power or ground-fault circuit interrupters.

6.3.2.2.8.8

Where GFCI protection is used in an operating room, one of the following shall apply:

(1) Each receptacle shall be an individual GFCI device.

(2) Each receptacle shall be individually protected by a single GFCI device.

6.3.2.2.9 Isolated Power.

6.3.2.2.9.1

An isolated power system shall not be required to be installed in any patient care space, except as specified in 6.3.2.2.8.

6.3.2.2.9.2

The system shall be permitted to be installed where it conforms to the performance requirements specified in 6.3.2.6.

6.3.2.2.10 Essential Electrical Systems (EES).

6.3.2.2.10.1

Category 1 spaces shall be served only by a Type 1 EES.

6.3.2.2.10.2

Category 2 spaces shall be served by a Type 1 or Type 2 EES.

6.3.2.2.10.3

A Type I EES serving a Category 1 space shall be permitted to serve Category 2 spaces in the same facility.

6.3.2.2.10.4

Category 3 or Category 4 spaces shall not be required to be served by an EES.

6.3.2.2.11 Battery-Powered Lighting Units.

6.3.2.2.11.1

One or more battery-powered lighting units shall be provided within locations where deep sedation and general anesthesia is administered.

6.3.2.2.11.2

The lighting level of each unit shall be sufficient to terminate procedures intended to be performed within the operating room.

6.3.2.2.11.3

The sensor for units shall be wired to the branch circuit(s) serving general lighting within the room.

6.3.2.2.11.4

Units shall be capable of providing lighting for 1 ½ hours.

6.3.2.2.11.5

Units shall be tested monthly for 30 seconds, and annually for 30 minutes.

Statement of Problem and Substantiation for Public Input

Not all spaces for patient care are rooms. Pre-op or Post-op areas are an example.

Submitter Information Verification

Submitter Full Name: MICHAEL ANTHONY
Organization: UNIVERSITY OF MICHIGAN
Affilliation: IEEE Education & Healthcare Facilities Committee
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 14:13:11 EDT 2015

Committee Statement

Resolution: The proposed language is inconsistent with the terminology in 3.3.127 which defines patient care space. See action on PI 507 which is similar.

Public Input No. 507-NFPA 99-2015 [Section No. 6.3.2.2]

6.3.2.2 All Patient Care ~~Rooms~~ Spaces .

6.3.2.2.1*

Branch circuit wiring 600 V or less shall comply with the requirements in 6.3.2.2.1.1 through 6.3.2.2.1.4.

6.3.2.2.1.1* Circuits.

(A)

Branch circuits serving a given patient bed location shall be fed from not more than one normal branch-circuit distribution panel.

(B)

When required, branch circuits serving a given patient bed location shall be permitted to be fed from more than one critical branch-circuit distribution panel.

6.3.2.2.1.2 Category 1 Spaces.

Category 1 spaces shall be served by circuits from a critical branch panel(s) served from a single automatic transfer switch and a minimum of one circuit served by the normal power distribution system or by a system originating from a second critical branch automatic transfer switch.

6.3.2.2.1.3 Access to Overcurrent Protective Devices.

(A)

Only authorized personnel shall have access to overcurrent protective devices serving Category 1 and Category 2 spaces.

(B)

Overcurrent protective devices serving Category 1 and Category 2 spaces shall not be permitted to be located in public access spaces.

(C)

Where used in locations such as in Category 1 spaces, isolated power panels shall be permitted in those locations.

6.3.2.2.1.4 Special-Purpose Outlets.

Branch circuits serving only special-purpose outlets or receptacles (e.g., portable X-ray receptacles) shall not be required to conform to the requirements of 6.3.2.2.1.2.

6.3.2.2.2

Grounding requirements shall comply with the requirements in 6.3.2.2.2.1 through 6.3.2.2.2.4.

6.3.2.2.2.1 Grounding Circuitry Integrity.

Grounding circuits and conductors in patient care spaces shall be installed in such a way that the continuity of other parts of those circuits cannot be interrupted nor the resistance raised above an acceptable level by the installation, removal, and replacement of any installed equipment, including power receptacles.

6.3.2.2.2.2 Reliability of Grounding.

The grounding conductor shall conform to *NFPA 70*, *National Electrical Code*.

6.3.2.2.2.3 Separate Grounding Conductor.

When existing construction does not have a separate grounding conductor, the continued use of the system shall be permitted, provided that it meets the performance requirements in 6.3.3.1.

6.3.2.2.2.4 Metal Receptacle Boxes.

Where metal receptacle boxes are used, the performance of the connection between the receptacle grounding terminal and the metal box shall be equivalent to the performance provided by copper wire no smaller than 12 AWG.

6.3.2.2.3* Grounding Interconnects.

In patient care spaces supplied by the normal distribution system and any branch of the essential electrical system, the grounding system of the normal distribution system and that of the essential electrical system shall be interconnected.

6.3.2.2.4 Protection Against Ground Faults.

6.3.2.2.4.1* Equipment Protection.

The main and downstream ground-fault protective devices (where required) shall be coordinated as required in 6.3.2.5.

6.3.2.2.4.2 Personnel Protection.

If used, ground-fault circuit interrupters (GFCIs) shall be listed.

6.3.2.2.5

Low-voltage wiring shall comply with either of the following:

(1) Fixed systems of 30 V (dc or ac rms) or less shall be permitted to be ungrounded, provided that the insulation between each ungrounded conductor and the primary circuit, which is supplied from a conventionally grounded distribution system, is the same protection as required for the primary voltage.

(2) A grounded low-voltage system shall be permitted, provided that load currents are not carried in the grounding conductors.

6.3.2.2.6 Receptacles.

6.3.2.2.6.1* Types of Receptacles.

(A)

Each power receptacle shall provide at least one separate, highly dependable grounding pole capable of maintaining low-contact resistance with its mating plug, despite electrical and mechanical abuse. The grounding terminal of each receptacle shall be connected to the reference grounding point by means of an insulated copper equipment grounding conductor.

(B)

Special receptacles, such as the following, shall be permitted:

(1) Four-pole units providing an extra pole for redundant grounding or ground continuity monitoring

(2) Locking-type receptacles

(3) Where required for reduction of electrical noise on the grounding circuit, receptacles in which the grounding terminals are purposely insulated from the receptacle yoke

(C)

All single, duplex, or quadruplex type receptacles, or any combination thereof, located at patent bed locations in Category 1 spaces shall be listed hospital grade.

6.3.2.2.6.2 Minimum Number of Receptacles.

The number of receptacles shall be determined by the intended use of the spaces in accordance with 6.3.2.2.6.2(A) through 6.3.2.2.6.2(F).

(A)

Receptacles for Patient Bed Locations in Category 2 Spaces. Each patient bed location shall be provided with a minimum of eight receptacles. They shall be permitted to be of the locking or nonlocking type, single, duplex, or quadruplex type, or any combination of the three. All receptacles shall be listed hospital grade.

(B)

Receptacles for Patient Bed Locations in Category 1 Spaces. Each patient bed location shall be provided with a minimum of 14 receptacles. They shall be permitted to be of the locking or nonlocking type, single, duplex, or quadruplex type, or any combination of the three. All receptacles shall be listed hospital grade.

(C)

Receptacles for Operating Rooms. Operating rooms shall be provided with a minimum of 36 receptacles. They shall be permitted to be of the locking or nonlocking type, single, duplex, or quadruplex type, or any combination of the three. All receptacles shall be listed hospital grade.

(D)

Receptacles for Bathrooms or Toilets. Receptacles shall not be required in bathrooms or toilet rooms.

(E)

Receptacles for Special Rooms. Receptacles shall not be required in rooms where medical requirements mandate otherwise (e.g., certain psychiatric, pediatric, or hydrotherapy rooms).

(F)

Designated Pediatric Locations. Receptacles that are located within the patient rooms, bathrooms, playrooms, and activity rooms of pediatric units or spaces with similar risk as determined by the governing body, other than nurseries, shall be listed tamper-resistant or shall employ a listed tamper-resistant cover.

6.3.2.2.6.3 Polarity of Receptacles.

Each receptacle shall be wired in accordance with *NFPA 70*, *National Electrical Code*, to ensure correct polarity.

6.3.2.2.6.4 Other Services Receptacles.

Receptacles provided for other services having different voltages, frequencies, or types on the same premises shall be of such design that attachment plugs and caps used in such receptacles cannot be connected to circuits of a different voltage, frequency, or type, but shall be interchangeable within each classification and rating required for two-wire, 125-V, single-phase ac service.

6.3.2.2.7 Special Grounding.

6.3.2.2.7.1* Use of Isolated Ground Receptacles.

(A)

An isolated ground receptacle, if used, shall not defeat the purposes of the safety features of the grounding systems detailed herein.

(B)

An isolated ground receptacle shall not be installed within a patient care vicinity.

6.3.2.2.7.2 Patient Equipment Grounding Point.

A patient equipment grounding point comprising one or more grounding terminals or jacks shall be permitted in an accessible location in the patient care vicinity.

6.3.2.2.7.3* Special Grounding in Patient Care Rooms.

In addition to the grounding required to meet the performance requirements of 6.3.3.1, additional grounding shall be permitted where special circumstances so dictate.

6.3.2.2.8 Wet Procedure Locations.

6.3.2.2.8.1*

Wet procedure locations shall be provided with special protection against electric shock.

6.3.2.2.8.2

This special protection shall be provided as follows:

(1) Power distribution system that inherently limits the possible ground-fault current due to a first fault to a low value, without interrupting the power supply

(2) Power distribution system in which the power supply is interrupted if the ground-fault current does, in fact, exceed the trip value of a Class A GFCI

6.3.2.2.8.3

Patient beds, toilets, bidets, and wash basins shall not be required to be considered wet procedure locations.

6.3.2.2.8.4*

Operating rooms shall be considered to be a wet procedure location, unless a risk assessment conducted by the health care governing body determines otherwise.

6.3.2.2.8.5

In existing construction, the requirements of 6.3.2.2.8.1 shall not be required when a written inspection procedure, acceptable to the authority having jurisdiction, is performed by a designated individual at the hospital to indicate that equipment grounding conductors for 120-V, single-phase, 15-A and 20-A receptacles; equipment connected by cord and plug; and fixed electrical equipment are installed and maintained in accordance with *NFPA 70*, *National Electrical Code*, and the applicable performance requirements of this chapter.

(A)

The procedure shall include electrical continuity tests of all required equipment, grounding conductors, and their connections.

(B)

Fixed receptacles, equipment connected by cord and plug, and fixed electrical equipment shall be tested as follows:

(1) When first installed

(2) Where there is evidence of damage

(3) After any repairs

6.3.2.2.8.6

The use of an isolated power system (IPS) shall be permitted as a protective means capable of limiting ground-fault current without power interruption. When installed, such a power system shall conform to the requirements of 6.3.2.6.

6.3.2.2.8.7*

Operating rooms defined as wet procedure locations shall be protected by either isolated power or ground-fault circuit interrupters.

6.3.2.2.8.8

Where GFCI protection is used in an operating room, one of the following shall apply:

(1) Each receptacle shall be an individual GFCI device.

(2) Each receptacle shall be individually protected by a single GFCI device.

6.3.2.2.9 Isolated Power.

6.3.2.2.9.1

An isolated power system shall not be required to be installed in any patient care space, except as specified in 6.3.2.2.8.

6.3.2.2.9.2

The system shall be permitted to be installed where it conforms to the performance requirements specified in 6.3.2.6.

6.3.2.2.10 Essential Electrical Systems (EES).

6.3.2.2.10.1

Category 1 spaces shall be served only by a Type 1 EES.

6.3.2.2.10.2

Category 2 spaces shall be served by a Type 1 or Type 2 EES.

6.3.2.2.10.3

A Type I EES serving a Category 1 space shall be permitted to serve Category 2 spaces in the same facility.

6.3.2.2.10.4

Category 3 or Category 4 spaces shall not be required to be served by an EES.

6.3.2.2.11 Battery-Powered Lighting Units.

6.3.2.2.11.1

One or more battery-powered lighting units shall be provided within locations where deep sedation and general anesthesia is administered.

6.3.2.2.11.2

The lighting level of each unit shall be sufficient to terminate procedures intended to be performed within the operating room.

6.3.2.2.11.3

The sensor for units shall be wired to the branch circuit(s) serving general lighting within the room.

6.3.2.2.11.4

Units shall be capable of providing lighting for 1 ½ hours.

6.3.2.2.11.5

Units shall be tested monthly for 30 seconds, and annually for 30 minutes.

Statement of Problem and Substantiation for Public Input

Corrected terminology to be consistent with the balance of the chapter.

Submitter Information Verification

Submitter Full Name: JASON DANTONA
Organization: THOMPSON CONSULTANTS INC
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 16:56:20 EDT 2015

Committee Statement

Resolution: FR-1-NFPA 99-2015

Statement: As requested by the Correlating Committee, a Task Group of the Technical Committee on Electrical Systems was formed to review the overall organization of Chapter 6. The numbering system of the current document has become cumbersome and does not follow NFPA style guidelines for 99. Additionally, the CC recommended that the Chapter follow more of a Risk-Based flow similar to that of Chapter 5. Additional goals of the proposed reorganization are to reduce the number of subheadings and duplications, while consolidating related requirements to make the Chapter more logical to users. Effort was made to ensure no requirement content was changed as part of the reorganization. The reorganization is intended to be purely editorial and not change any of the performance requirements of the chapter.

Public Input No. 480-NFPA 99-2015 [Section No. 6.3.2.2.1 [Excluding any Sub-Sections]]

~~Branch circuit wiring 600 V or less shall comply with the requirements in~~ ~~6.3.2.2.1.1~~ ~~through~~ ~~6.3.2.2.1.4~~ ~~.~~

Statement of Problem and Substantiation for Public Input

This section requires that branch circuit wiring in patient care rooms which is 600V or less must comply with the requirements of 6.3.2.2.1.1 to 6.3.2.2.1.4. Sections 6.3.2.2.1.2 (Category 1 Spaces), 6.3.2.2.1.3 (access to over current devices) and 6.3.2.2.1.4 (special purpose outlets) do not necessarily only apply to branch circuits in patient care rooms.

Submitter Information Verification

Submitter Full Name: JASON DANTONA
Organization: THOMPSON CONSULTANTS INC
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 16:23:30 EDT 2015

Committee Statement

Resolution: FR-6-NFPA 99-2015
Statement: This section requires that branch circuit wiring in patient care rooms which is 600V or less must comply with the requirements of 6.3.2.2.1.1 to 6.3.2.2.1.4. Sections 6.3.2.2.1.2 (Category 1 Spaces), 6.3.2.2.1.3 (access to over current devices) and 6.3.2.2.1.4 (special purpose outlets) do not necessarily only apply to branch circuits in patient care rooms.

Public Input No. 438-NFPA 99-2015 [Section No. 6.3.2.2.1.1]

6.3.2.2.1.1* Circuits.

(A)

Branch circuits serving a given patient bed location shall be fed from not more than one normal branch-circuit distribution panel.

(B)

When required, branch circuits serving a given patient bed location shall be permitted to be fed from more than one critical branch-circuit distribution panel.

(C)

All branch circuits panels serving a patient bed location, either normal or critical power, shall have their ground buses connected together to assure equal ground potential at the bed location.

Statement of Problem and Substantiation for Public Input

This will make design and installation clear to avoid a voltage differential hazard.,

This concept with jointly prepared with Jim Harvey, University of Michigan Hospitals

Submitter Information Verification

Submitter Full Name: MICHAEL ANTHONY
Organization: UNIVERSITY OF MICHIGAN
Affilliation: University of Michigan
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 13:48:58 EDT 2015

Committee Statement

Resolution: Section 6.3.2.2.3 and Article 517 of the NEC address this issue adequately. Adding this language here could add confusion.

Public Input No. 441-NFPA 99-2015 [Section No. 6.3.2.2.1.1]

6.3.2.2.1.1* Circuits.

(A)

Branch circuits serving a given patient bed location shall be fed from not more than one normal branch-circuit distribution panel.

(B)

~~When required, branch~~ Branch circuits serving a given patient bed location shall be permitted to be fed from more than one critical branch-circuit distribution panel.

Statement of Problem and Substantiation for Public Input

The "when required" language does not seem to correspond to the "it shall be permitted" language. This is an attempt to clarify; the committee may have a better suggestion.

Submitter Information Verification

Submitter Full Name: MICHAEL ANTHONY
Organization: UNIVERSITY OF MICHIGAN
Affilliation: IEEE Education & Healthcare Facilities Committee
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 14:00:44 EDT 2015

Committee Statement

Resolution: FR-7-NFPA 99-2015
Statement: The "when required" language does not seem to correspond to the "it shall be permitted" language. This is an attempt to clarify.

The separation of normal and EES circuits from each other, as required by NFPA 70 Article 700 and by NFPA 99, are clarified by these revisions to improve readability of the Code.

Public Input No. 474-NFPA 99-2015 [Section No. 6.3.2.2.1.1]

6.3.2.2.1.1* Circuits.

(A)

Branch circuits serving a given patient bed location shall be fed from not more than one normal branch-circuit distribution panel.

(A1)Branch circuits serving a given patient bed location shall be fed from not more than one essential branch-circuit distribution panel.

(A2) For reliability reasons inpatient bed locations should be served by an equal number of dedicated or shared, normal and essential power circuits. In locations such as ICU's the circuits should be dedicated circuits

(B)

When required, branch circuits serving a given patient bed location shall be permitted to be fed from more than one critical branch-circuit distribution panel.

Statement of Problem and Substantiation for Public Input

Two important end-use equipment reliability consideraions

Submitter Information Verification

Submitter Full Name: MICHAEL ANTHONY
Organization: UNIVERSITY OF MICHIGAN & University of MIchigan Hospitals (James R. Harvey)
Affilliation: IEEE Education & Healthcare Faciilties Committee
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 16:08:23 EDT 2015

Committee Statement

Resolution: Since the critical branch are one of the three branches comprising the essential electrical system, the proposed requirement to limit EES branch circuits to being supplied from only one EES distribution panel would conflict with the existing requirement of 6.3.2.2.1.1(B). Life safety branches and equipment branches of EES serve essential functions that are not specific to an individual patient bed location. Further, 6.4.2.2.6.1 requires the life safety branch and critical branches be kept separate from the equipment branch of the EES (Type 1), as well as from normal branches. Similarly, 6.5.2.2.4.1 requires the life safety branch and equipment branches of the EES (Type 2) be kept separate from the critical branch of the EES (Type 1), as well as from normal branches. The proposed requirement for serving patient bed locations being served by more than one distribution panel (and consequently more than one circuit) is already addressed by 6.3.2.2.1.2.

Public Input No. 523-NFPA 99-2015 [New Section after 6.3.2.2.1.3]

Category 2 Spaces

Category 2 spaces shall be served by circuits from an equipment branch panel(s) served from a single automatic transfer switch and a minimum of one circuit served by the normal power distribution system or by a system originating from a second equipment branch automatic transfer switch.

Statement of Problem and Substantiation for Public Input

This requirement is necessary to adequately define the circuit arrangement in a Category 2 Space. This requirement is identical to the requirements of 6.3.2.2.1.2 except for replacing 'critical' with 'equipment' in accordance with the requirements of 6.5.2.2.3.4(C)

Submitter Information Verification

Submitter Full Name: JASON DANTONA
Organization: THOMPSON CONSULTANTS INC
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 17:36:17 EDT 2015

Committee Statement

Resolution: FR-8-NFPA 99-2015

Statement: This requirement is necessary to adequately define the circuit arrangement in a Category 2 Space served by a Type 2 EES. This requirement is identical to the requirements of 6.3.2.2.1.2 except for replacing 'critical' with 'equipment' in accordance with the requirements of 6.5.2.2.3.4(C). If a Category 2 Space is served by a Type 1 EES, it is still intended that these circuits be connected to the critical branch.

Public Input No. 315-NFPA 99-2015 [Section No. 6.3.2.2.2.2]

6.3.2.2.2.2 Reliability of Grounding.

The grounding conductor shall conform to *NFPA 70*, *National Electrical Code*. An outlet serving electrical equipment within the patient care vicinity shall be provided with effective ground-fault current paths dual-fed by a wiring method that qualifies as an equipment grounding conductor and by an insulated copper equipment grounding conductor.

Statement of Problem and Substantiation for Public Input

Although 6.3.2.2.7.1 indicates appropriately that isolated ground receptacles are prohibited from patient care vicinities, the same situation exists with the use of corded relocatable power taps (RPTs, colloquially known as "power strips" and "plug strips"). The power supply cord provides a SINGLE grounding path to the receptacles employed as components within the RPT. Inclusion of this performance requirement would provide clarification as to the objective of 6.3.2.2.7.1.

Submitter Information Verification

Submitter Full Name: BRIAN ROCK
Organization: HUBBELL INCORPORATED
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jul 02 14:30:46 EDT 2015

Committee Statement

Resolution: FR-31-NFPA 99-2015
Statement: The inclusion of this performance requirement is intended to provide clarification as to the objective of 6.3.2.2.7.1.

Public Input No. 396-NFPA 99-2015 [Section No. 6.3.2.2.2.3]

6.3.2.2.2.3 Separate Grounding Conductor.

The equipment grounding terminal buses of the normal and essential branch-circuit panelboards serving the same individual patient care vicinity shall be connected together with an insulated continuous copper conductor not smaller than 10 AWG. Where two or more panelboards serving the same individual patient care vicinity are served from separate transfer switches on the essential electrical system, the equipment grounding terminal buses of those panelboards shall be connected together with an insulated continuous copper conductor not smaller than 10 AWG. This conductor shall be permitted to be broken in order to terminate on the equipment grounding terminal bus in each panelboard.

When existing construction does not have a separate grounding conductor, the continued use of the system shall be permitted, provided that it meets the performance requirements in 6.3.3.1.

Statement of Problem and Substantiation for Public Input

Various recent Standards Council decisions have clearly established that NFPA 99, Health Care Facilities Code, is a performance code. These same Standards Council decisions have clearly established NFPA 70, National Electrical Code, as an installation code. This is consistent with each document's published scope. With this clear delineation established, NFPA 99, a performance code, cannot modify NFPA 70, an installation code. This modification cannot occur because NFPA 99, as a performance code, does not have jurisdiction over installation elements found in NFPA 70, or any other NFPA installation code. For this reason, certain elements of NFPA 70 must be written in NFPA 99.
NFPA 70: National Electrical Code 2014 517.14 contains language similar to what is show above. This PI is an attempt to clarify and align requirements in NFPA 70 and NFPA 99. This language should be contained in NFPA 99 as direction for design and installation requirements clarifying panelboard grounding and eliminating confusion for designers, installers, inspectors, and maintenance workers.

Submitter Information Verification

Submitter Full Name: GARY BECKSTRAND
Organization: UTAH ELECTRICAL JATC
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jul 05 13:11:09 EDT 2015

Committee Statement

Resolution: The proposed language is an installation requirement as opposed to performance requirement and should be contained in the NEC.

Public Input No. 110-NFPA 99-2015 [Section No. 6.3.2.2.2.4]

6.3.2.2.2.4 Metal ~~Receptacle Boxes~~ Outlet Boxes, Metal Device Boxes, and Metal Enclosures for Receptacles .

Where receptacles are mounted in metal ~~receptacle~~ outllet boxes ~~are used,~~ , metal device boxes, or metal enclosures, the performance of the connection between the receptacle grounding terminal and the metal box or enclosure shall be equivalent to the performance provided by copper wire sized in accordance with 250.146 and Table 250.122 of NFPA 70, National Electrical Code®, but no smaller than 12 AWG.

Statement of Problem and Substantiation for Public Input

The term "metal receptacle boxes" is inconsistent with the term "metal outlet boxes" or "metal device boxes" used in the National Electrical Code® NFPA 70 (e.g., "Article 314 Outlet, Device, Pull, and Junction Boxes ...") and the Safety Standard UL 514A under which such metal outlet boxes (for receptacles) are evaluated. In NEC® 517.13(B)(1), a Public Input to use extracted wording from NFPA 99-2015 6.3.2.2.2.4 introduces inconsistency that degrades needlessly the readability of the NEC®.

Furthermore, receptacles are not only flush- or-surface-mounted in metal outlet boxes or metal device boxes, but can be panel-mounted in metal enclosures that present the same safety concerns. NEC® 517.13(B)(1) EXPLICITLY recognizes receptacles mounted in metal enclosures and imposes the same grounding requirements as for outlet and device boxes.

6.3.2.2.2.2 addresses the equipment grounding conductor of NEC® 250.122, whereas 6.3.2.2.2.4 addresses the equipment bonding jumper (or equivalent connection) of NEC® 250.146 between the receptacle and the metal box or metal enclosure. Although 6.3.2.2.2.2 makes it clear that the equipment grounding conductor shall be sized in accordance with NEC® 250.122 and Table 250.122, as 6.3.2.2.2.4 is presently stated, however, it is ambiguous whether 6.3.2.2.2.4 permits equipment bonding jumpers to be sized as copper 12 AWG for 60A, 100A, and 200A receptacles rather than to be unequivocally equivalent to copper 10 AWG, 8 AWG, or 6 AWG, respectively, in accordance with the minimum sizes of NEC® 250.146 and Table 250.122.

Submitter Information Verification

Submitter Full Name: BRIAN ROCK
Organization: HUBBELL INCORPORATED
Street Address:
City:
State:
Zip:
Submittal Date: Wed May 13 22:37:19 EDT 2015

Committee Statement

Resolution: FR-30-NFPA 99-2015

Statement: This revision correlates NFPA 99 with Section 517.13 of NFPA 70, National Electrical Code®. Clarification will assist and provide direction for design, installation, inspection, and maintenance requirements for receptacle grounding in patent care spaces.

Conductor color requirements for the Equipment Grounding Conductor using and insulated conductor of green is added to provide clear and distinct installation requirements for the Isolated Equipment Grounding Conductor associated with the revised PI in 6.3.2.2.7.1.

Metal faceplates are required by Section 406.6(B) of NFPA 70, National Electrical Code® to be grounded. This is not permissively optional.

An equipment bonding jumper (or its equivalent, a listed self-grounding contact device or direct metal-to-metal contact with insulating screw-retention washers removed) is required by Section 250.146 of NFPA 70, National Electrical Code®. This is not permissively optional.

The revision to exclude isolated ground receptacles is essential to correlate with 6.3.2.2.7.1 as modified and to avoid defeating the isolated grounding of an IG receptacle by miswiring.

The term "metal receptacle boxes" is inconsistent with the term "metal outlet boxes" or "metal device boxes" used in the National Electrical Code® NFPA 70 (e.g., "Article 314 Outlet, Device, Pull, and Junction Boxes ...") and the Safety Standard UL 514A under which such metal outlet boxes (for receptacles) are evaluated.

Although 6.3.2.2.2.2 makes it clear that the equipment grounding conductor shall be sized in accordance with NEC® 250.122 and Table 250.122, as 6.3.2.2.2.4 is presently stated, however, it is ambiguous whether 6.3.2.2.2.4 permits equipment bonding jumpers to be sized as copper 12 AWG for 60A, 100A, and 200A receptacles rather than to be unequivocally equivalent to

copper 10 AWG, 8 AWG, or 6 AWG, respectively, in accordance with the minimum sizes of NEC® 250.146 and Table 250.122.

Public Input No. 394-NFPA 99-2015 [Section No. 6.3.2.2.2.4]

6.3.2.2.2.4 ~~Metal Receptacle Boxes.~~

Grounding of Receptacles and Fixed Electrical Equipment in Patient Care Spaces.

(A) All branch circuits serving patient care spaces shall be provided with an effective ground-fault current path by installation in a metal raceway system, or a cable having a metallic armor or sheath assembly. The metal raceway system, or metallic cable armor, or sheath assembly shall itself qualify as an equipment grounding conductor .

(B) Insulated Equipment Grounding Conductor.

The following shall be directly connected to an insulated copper equipment grounding conductor that is green along its entire length and installed with the branch circuit conductors in the wiring methods as provided in 6.3.2.2.2.4(A):

1. The grounding terminals of all receptacles .

2. Where metal receptacle boxes are used, the performance of the connection between the receptacle grounding terminal and the metal box shall be equivalent to the performance provided by copper wire no smaller than 12 AWG.

. All non–current-carrying conductive surfaces of fixed electrical equipment likely to become energized that are subject to personal contact, operating at over 100 volts.

4. An insulated equipment bonding jumper that directly connects to the equipment grounding conductor is permitted to connect the box and receptacle(s) to the equipment grounding conductor.

5. Metal faceplates shall be permitted to be connected to the equipment grounding conductor by means of a metal mounting screw(s) securing the faceplate to a grounded outlet box or grounded wiring device.

6. Luminaires more than 2.3 m (7 ½ ft) above the floor and switches located outside of the patient care vicinity shall be permitted to be connected to an equipment grounding return path complying with 6.3.2.2.2.4(A) and (B).

Statement of Problem and Substantiation for Public Input

Various recent Standards Council decisions have clearly established that NFPA 99, Health Care Facilities Code, is a performance code. These same Standards Council decisions have clearly established NFPA 70, National Electrical Code, as an installation code. This is consistent with each document's published scope. With this clear delineation established, NFPA 99, a performance code, cannot modify NFPA 70, an installation code. This modification cannot occur because NFPA 99, as a performance code, does not have jurisdiction over installation elements found in NFPA 70, or any other NFPA installation code. For this reason, certain elements of NFPA 70 must be written in NFPA 99.
Conductor color requirements for the Equipment Grounding Conductor using and insulated conductor of green is established to provide clear and distinct installation requirements for the Isolated Equipment Grounding Conductor associated with the revised PI requested in 6.3.2.2.7.1.

NFPA 70: National Electrical Code 2014 517.13 contains language similar to what is show above. This PI is an attempt to clarify and align requirements in NFPA 70 and NFPA 99. This language should be contained in NFPA 99 as direction for design and installation requirements clarifying receptacle grounding requirements for patent care areas and eliminating confusion for designers, installers, inspectors, and maintenance workers.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 392-NFPA 99-2015 [Section No. 6.3.2.2.7.1]	

Submitter Information Verification

Submitter Full Name: GARY BECKSTRAND
Organization: UTAH ELECTRICAL JATC
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jul 05 13:04:44 EDT 2015

Committee Statement

Resolution: FR-30-NFPA 99-2015
Statement: This revision correlates NFPA 99 with Section 517.13 of NFPA 70, National Electrical Code®. Clarification will assist and provide direction for design, installation, inspection, and maintenance requirements for receptacle grounding in patent care spaces.

Conductor color requirements for the Equipment Grounding Conductor using and insulated conductor of green is added to provide clear and distinct installation requirements for the Isolated Equipment Grounding Conductor associated with the revised PI in 6.3.2.2.7.1.

Metal faceplates are required by Section 406.6(B) of NFPA 70, National Electrical Code® to be grounded. This is not permissively optional.

An equipment bonding jumper (or its equivalent, a listed self-grounding contact device or direct metal-to-metal contact with insulating screw-retention washers removed) is required by Section 250.146 of NFPA 70, National Electrical Code®. This is not permissively optional.

The revision to exclude isolated ground receptacles is essential to correlate with 6.3.2.2.7.1 as modified and to avoid defeating the isolated grounding of an IG receptacle by miswiring.

The term "metal receptacle boxes" is inconsistent with the term "metal outlet boxes" or "metal device boxes" used in the National Electrical Code® NFPA 70 (e.g., "Article 314 Outlet, Device, Pull, and Junction Boxes ...") and the Safety Standard UL 514A under which such metal outlet boxes (for receptacles) are evaluated.

Although 6.3.2.2.2.2 makes it clear that the equipment grounding conductor shall be sized in accordance with NEC® 250.122 and Table 250.122, as 6.3.2.2.2.4 is presently stated, however, it is ambiguous whether 6.3.2.2.2.4 permits equipment bonding jumpers to be sized as copper 12 AWG for 60A, 100A, and 200A receptacles rather than to be unequivocally equivalent to copper 10 AWG, 8 AWG, or 6 AWG, respectively, in accordance with the minimum sizes of NEC® 250.146 and Table 250.122.

Public Input No. 449-NFPA 99-2015 [Section No. 6.3.2.2.3]

6.3.2.2.3* Grounding Interconnects.

In patient care spaces supplied by the normal distribution system and any branch of the essential electrical system, the grounding system of the normal distribution system and that of the essential electrical system shall be ~~interconnected~~ bonded .

Statement of Problem and Substantiation for Public Input

"Bonded" is the better word.

Submitter Information Verification

Submitter Full Name: MICHAEL ANTHONY
Organization: UNIVERSITY OF MICHIGAN
Affilliation: IEEE Education & Healthcare Facilities Committee
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 14:17:22 EDT 2015

Committee Statement

Resolution: It is recognized that the equipment grounding conductor also performs bonding. An NEC® Correlating Committee Task Group was formed in the 2005 NEC® cycle to address the concepts regarding grounding and bonding. No new information has been submitted that would cause this to be reversed.

Public Input No. 475-NFPA 99-2015 [Section No. 6.3.2.2.3]

6.3.2.2.3* Grounding Interconnects.

In patient care spaces supplied by the normal distribution system and any branch of the essential electrical system, the ~~grounding system~~ ground bar of the normal ~~distribution system~~ power panels and that of the essential electrical system shall be interconnected and bonded .

Statement of Problem and Substantiation for Public Input

This makes visualzing the necessary bonding easier by intending the actual grounding system component. See related proposal. .

Submitter Information Verification

Submitter Full Name: MICHAEL ANTHONY
Organization: UNIVERSITY OF MICHIGAN & University of Michigan Hospitals (James R. Harvey)
Affilliation: IEEE Education & Healthcare Facilities Committee
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 16:17:00 EDT 2015

Committee Statement

Resolution: It is recognized that the equipment grounding conductor also performs bonding. An NEC® Correlating Committee Task Group was formed in the 2005 NEC® cycle to address the concepts regarding grounding and bonding. No new information has been submitted that would cause this to be reversed.

Public Input No. 511-NFPA 99-2015 [Section No. 6.3.2.2.6]

6.3.2.2.6 Receptacles.

6.3.2.2.6.1* Types of Receptacles.

(A)

Each power receptacle shall provide at least one separate, highly dependable grounding pole capable of maintaining low-contact resistance with its mating plug, despite electrical and mechanical abuse. The grounding terminal of each receptacle shall be connected to the reference grounding point by means of an insulated copper equipment grounding conductor.

(B)

Special receptacles, such as the following, shall be permitted:

(1) Four-pole units providing an extra pole for redundant grounding or ground continuity monitoring

(2) Locking-type receptacles

(3) Where required for reduction of electrical noise on the grounding circuit, receptacles in which the grounding terminals are purposely insulated from the receptacle yoke

(C)

All single, duplex, or quadruplex type receptacles, or any combination thereof, located at patent bed locations in Category 1 spaces shall be listed hospital grade.

6.3.2.2.6.2 Minimum Number of Receptacles.

The number of receptacles shall be determined by the intended use of the spaces in accordance with 6.3.2.2.6.2(A) through 6.3.2.2.6.2(F).

(A)

Receptacles for Patient Bed Locations in Category 2 Spaces. Each patient bed location shall be provided with a minimum of eight receptacles. They shall be permitted to be of the locking or nonlocking type, single, duplex, or quadruplex type, or any combination of the three. All receptacles shall be listed hospital grade.

(B)

Receptacles for Patient Bed Locations in Category 1 Spaces. Each patient bed location shall be provided with a minimum of 14 receptacles. They shall be permitted to be of the locking or nonlocking type, single, duplex, or quadruplex type, or any combination of the three. ~~All receptacles shall be listed hospital grade.~~

(C)

Receptacles for Operating Rooms. Operating rooms shall be provided with a minimum of 36 receptacles. They shall be permitted to be of the locking or nonlocking type, single, duplex, or quadruplex type, or any combination of the three. ~~All receptacles shall be listed hospital grade.~~

(D)

Receptacles for Bathrooms or Toilets. Receptacles shall not be required in bathrooms or toilet rooms.

(E)

Receptacles for Special Rooms. Receptacles shall not be required in rooms where medical requirements mandate otherwise (e.g., certain psychiatric, pediatric, or hydrotherapy rooms).

(F)

Designated Pediatric Locations. Receptacles that are located within the patient rooms, bathrooms, playrooms, and activity rooms of pediatric units or spaces with similar risk as determined by the governing body, other than nurseries, shall be listed tamper-resistant or shall employ a listed tamper-resistant cover.

6.3.2.2.6.3 Polarity of Receptacles.

Each receptacle shall be wired in accordance with *NFPA 70*, *National Electrical Code*, to ensure correct polarity.

6.3.2.2.6.4 Other Services Receptacles.

Receptacles provided for other services having different voltages, frequencies, or types on the same premises shall be of such design that attachment plugs and caps used in such receptacles cannot be connected to circuits of a different voltage, frequency, or type, but shall be interchangeable within each classification and rating required for two-wire, 125-V, single-phase ac service.

Statement of Problem and Substantiation for Public Input

This change moves the requirements for hospital grade receptacles from the section describing the minimum number of receptacles (6.2.2.6.2) to the section describing the types of receptacles (6.2.2.6.1)

Submitter Information Verification

Submitter Full Name: JASON DANTONA
Organization: THOMPSON CONSULTANTS INC
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 17:00:39 EDT 2015

Committee Statement

Resolution: FR-9-NFPA 99-2015

Statement: Many of the requirements of 6.3.2.2.6.2 relate to TYPES of receptacles rather than MINIMUM NUMBERS. This revision also removes redundant language from the final sentence of 6.3.2.2.6.2(A) for Category 1 spaces and relocates the similar requirement from Category 2 spaces and operating rooms in the final sentences of 6.3.2.2.6.2(B) and (C). References to receptacles being listed as “hospital grade” in those sections have been relocated for clarity to the code users. Similarly, 6.3.2.2.6.2(F) for tamper-resistant receptacles has been relocated to 6.3.2.2.6.1.

The requirements for Hospital Grade receptacles in UL Standard UL 498, Attachment Plugs and Receptacles, Supplement SD are inherently limited by their nature to 125- and 250-volt, 15- and 20-ampere, NONLOCKING-type receptacles and CANNOT be applied to receptacles of the locking type. The Scope of UL 498, Attachment Plugs and Receptacles, Supplement SD, reads:

“SD1.1 The requirements of this supplement cover Hospital Grade attachment plugs, cord connectors, and receptacles, intended for hospital use in other than hazardous locations in accordance with Article 517 of the National Electrical Code, ANSI/NFPA 70. THEY ARE APPLICABLE ONLY TO NONLOCKING-TYPE DEVICES OF THE 5-15, 6-15, 5-20, AND 6-20 CONFIGURATIONS. Receptacles shall be intended only for flush installation, and plugs and connectors shall be either of the straight type (flexible cord exits at the rear of the device) or angled type (cord exits at an angle to the major plug axis) intended for field assembly on flexible cord.” [Emphasis added. NEMA Standard WD6 receptacle configuration designations "5-15, 6-15, 5-20, and 6-20" refer to the dimensional configurations for grounding-type, single-phase (i.e., 2-pole, 3-wire), 15- and 20-ampere, 125- and 250-volt, NONLOCKING-type receptacles.]

Consequently, the requirements must state that the REQUIRED receptacles are limited to 125-volt, 15- or 20-ampere, NONLOCKING-type receptacles that are listed Hospital Grade. The intent was to set requirements for the REQUIRED quantity of hospital grade receptacles and to permit separately that any other receptacles beyond those minimum numbers to be either of the nonlocking or locking type for design flexibility for specialized cord-and-plug-connected equipment.

Furthermore, inclusion of locking-type receptacles in 6.3.2.2.6.2(B) that inherently cannot be listed Hospital Grade represents a correlation conflict with the requirements of 6.3.2.2.6.1(C) that limit receptacles at patient bed locations in Category 1 to listed hospital grade.

Public Input No. 499-NFPA 99-2015 [Section No. 6.3.2.2.6.1(B)]

(B)

Special receptacles, such as the following, shall be permitted:

(1) Four-pole units providing an extra pole for redundant grounding or ground continuity monitoring

(2) Locking-type receptacles

(3) ~~Where required for reduction of electrical noise on the grounding circuit, receptacles in which the grounding terminals are purposely insulated from the receptacle yoke~~

(4)

Statement of Problem and Substantiation for Public Input

The requirements for isolated ground receptacles are already outlined in section 6.3.2.2.7.1. There is no prohibition for the installation of these types of receptacles in areas outside of the patient care vicinity therefore this section does not contain any additional requirements and is unnecessary.

Submitter Information Verification

Submitter Full Name: JASON DANTONA
Organization: THOMPSON CONSULTANTS INC
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 16:46:46 EDT 2015

Committee Statement

Resolution: FR-9-NFPA 99-2015

Statement: Many of the requirements of 6.3.2.2.6.2 relate to TYPES of receptacles rather than MINIMUM NUMBERS. This revision also removes redundant language from the final sentence of 6.3.2.2.6.2(A) for Category 1 spaces and relocates the similar requirement from Category 2 spaces and operating rooms in the final sentences of 6.3.2.2.6.2(B) and (C). References to receptacles being listed as “hospital grade” in those sections have been relocated for clarity to the code users. Similarly, 6.3.2.2.6.2(F) for tamper-resistant receptacles has been relocated to 6.3.2.2.6.1.

The requirements for Hospital Grade receptacles in UL Standard UL 498, Attachment Plugs and Receptacles, Supplement SD are inherently limited by their nature to 125- and 250-volt, 15- and 20-ampere, NONLOCKING-type receptacles and CANNOT be applied to receptacles of the locking type. The Scope of UL 498, Attachment Plugs and Receptacles, Supplement SD, reads:

“SD1.1 The requirements of this supplement cover Hospital Grade attachment plugs, cord connectors, and receptacles, intended for hospital use in other than hazardous locations in accordance with Article 517 of the National Electrical Code, ANSI/NFPA 70. THEY ARE APPLICABLE ONLY TO NONLOCKING-TYPE DEVICES OF THE 5-15, 6-15, 5-20, AND 6-20 CONFIGURATIONS. Receptacles shall be intended only for flush installation, and plugs and connectors shall be either of the straight type (flexible cord exits at the rear of the device) or angled type (cord exits at an angle to the major plug axis) intended for field assembly on flexible cord.” [Emphasis added. NEMA Standard WD6 receptacle configuration designations "5-15, 6-15, 5-20, and 6-20" refer to the dimensional configurations for grounding-type, single-phase (i.e., 2-pole, 3-wire), 15- and 20-ampere, 125- and 250-volt, NONLOCKING-type receptacles.]

Consequently, the requirements must state that the REQUIRED receptacles are limited to 125-volt, 15- or 20-ampere, NONLOCKING-type receptacles that are listed Hospital Grade. The intent was to set requirements for the REQUIRED quantity of hospital grade receptacles and to permit separately that any other receptacles beyond those minimum numbers to be either of the nonlocking or locking type for design flexibility for specialized cord-and-plug-connected equipment.

Furthermore, inclusion of locking-type receptacles in 6.3.2.2.6.2(B) that inherently cannot be listed Hospital Grade represents a correlation conflict with the requirements of 6.3.2.2.6.1(C) that limit receptacles at patient bed locations in Category 1 to listed hospital grade.

Public Input No. 16-NFPA 99-2015 [Section No. 6.3.2.2.6.2]

6.3.2.2.6.2 Minimum Number of Receptacles.

The number of receptacles shall be determined by the intended use of the spaces in accordance with 6.3.2.2.6.2(A) through 6.3.2.2.6.2(F).

(A)

Receptacles for Patient Bed Locations in Category 2 Spaces. Each patient bed location shall be provided with a minimum of eight nonlocking-type, 125-volt, 15- or 20-ampere receptacles. They shall be permitted to be of the ~~locking or nonlocking type,~~ single, duplex, or quadruplex type, or any combination of the three. All 125- and 250-volt, 15- and 20-ampere, nonlocking-type receptacles shall be listed hospital grade. Other receptacles (e.g., portable X-ray receptacles) serving special-purpose, cord-and-plug-connected equipment shall be permitted to be of the locking or nonlocking type.

(B)

Receptacles for Patient Bed Locations in Category 1 Spaces. Each patient bed location shall be provided with a minimum of 14 nonlocking-type, 125-volt, 15- or 20-ampere receptacles. They shall be permitted to be of the ~~locking or nonlocking type,~~ single, duplex, or quadruplex type, or any combination of the three. All 125- and 250-volt, 15- and 20-ampere, nonlocking-type receptacles shall be listed hospital grade. Other receptacles (e.g., portable X-ray receptacles) serving special-purpose, cord-and-plug-connected equipment shall be permitted to be of the locking or nonlocking type.

(C)

Receptacles for Operating Rooms. Operating rooms shall be provided with a minimum of 36 nonlocking-type, 125-volt, 15- or 20-ampere receptacles. They shall be permitted to be of the ~~locking or nonlocking type,~~ single, duplex, or quadruplex type, or any combination of the three. All 125- and 250-volt, 15- and 20-ampere, nonlocking-type receptacles shall be listed hospital grade. Other receptacles (e.g., portable X-ray receptacles) serving special-purpose, cord-and-plug-connected equipment shall be permitted to be of the locking or nonlocking type.

(D)

Receptacles for Bathrooms or Toilets. Receptacles shall not be required in bathrooms or toilet rooms.

(E)

Receptacles for Special Rooms. Receptacles shall not be required in rooms where medical requirements mandate otherwise (e.g., certain psychiatric, pediatric, or hydrotherapy rooms).

(F)

Designated Pediatric Locations. Receptacles that are located within the patient rooms, bathrooms, playrooms, and activity rooms of pediatric units or spaces with similar risk as determined by the governing body, other than nurseries, shall be listed tamper-resistant or shall employ a listed tamper-resistant cover.

Statement of Problem and Substantiation for Public Input

The requirements for Hospital Grade receptacles in UL Standard UL 498, Attachment Plugs and Receptacles, Supplement SD are inherently limited by their nature to 125- and 250-volt, 15- and 20-ampere, NONLOCKING-type receptacles and CANNOT be applied to receptacles of the locking type. The Scope of UL 498, Attachment Plugs and Receptacles, Supplement SD, reads:

“SD1.1 The requirements of this supplement cover Hospital Grade attachment plugs, cord connectors, and receptacles, intended for hospital use in other than hazardous locations in accordance with Article 517 of the National Electrical Code, ANSI/NFPA 70. >>>THEY ARE APPLICABLE ONLY TO NONLOCKING-TYPE DEVICES OF THE 5-15, 6-15, 5-20, AND 6-20 CONFIGURATIONS.<<< Receptacles shall be intended only for flush installation, and plugs and connectors shall be either of the straight type (flexible cord exits at the rear of the device) or angled type (cord exits at an angle to the major plug axis) intended for field assembly on flexible cord.” [Emphasis added. NEMA Standard WD6 receptacle configuration designations "5-15, 6-15, 5-20, and 6-20" refer to the dimensional configurations for grounding-type, single-phase (i.e., 2-pole, 3-wire), 15- and 20-ampere, 125- and 250-volt, NONLOCKING-type receptacles.]

Either the requirements must state that the REQUIRED receptacles are limited to 125-volt, 15- or 20-ampere, NONLOCKING-type receptacles that are listed Hospital Grade or the requirement that receptacles be listed Hospital Grade must be limited to 125- and 250-volt, 15- and 20-ampere, NONLOCKING-type receptacles. In all likelihood, the committee’s intent was to set requirements for the REQUIRED quantity of hospital grade receptacles and to permit separately that any other receptacles beyond those minimum numbers to be either of the nonlocking or locking type for design flexibility for specialized cord-and-plug-connected equipment.

Furthermore, inclusion of locking-type receptacles in 6.3.2.2.6.2(B) that inherently cannot be listed Hospital Grade represents a correlation conflict with the requirements of 6.3.2.2.6.1(C) that limit receptacles at patient bed locations in Category 1 to listed hospital grade. This Public Input would reconcile that correlation issue.

Submitter Information Verification

Submitter Full Name: BRIAN ROCK
Organization: HUBBELL INCORPORATED

Street Address:
City:
State:
Zip:
Submittal Date: Sun Mar 22 10:53:34 EDT 2015

Committee Statement

Resolution: FR-9-NFPA 99-2015

Statement: Many of the requirements of 6.3.2.2.6.2 relate to TYPES of receptacles rather than MINIMUM NUMBERS. This revision also removes redundant language from the final sentence of 6.3.2.2.6.2(A) for Category 1 spaces and relocates the similar requirement from Category 2 spaces and operating rooms in the final sentences of 6.3.2.2.6.2(B) and (C). References to receptacles being listed as “hospital grade” in those sections have been relocated for clarity to the code users. Similarly, 6.3.2.2.6.2(F) for tamper-resistant receptacles has been relocated to 6.3.2.2.6.1.

The requirements for Hospital Grade receptacles in UL Standard UL 498, Attachment Plugs and Receptacles, Supplement SD are inherently limited by their nature to 125- and 250-volt, 15- and 20-ampere, NONLOCKING-type receptacles and CANNOT be applied to receptacles of the locking type. The Scope of UL 498, Attachment Plugs and Receptacles, Supplement SD, reads:

“SD1.1 The requirements of this supplement cover Hospital Grade attachment plugs, cord connectors, and receptacles, intended for hospital use in other than hazardous locations in accordance with Article 517 of the National Electrical Code, ANSI/NFPA 70. THEY ARE APPLICABLE ONLY TO NONLOCKING-TYPE DEVICES OF THE 5-15, 6-15, 5-20, AND 6-20 CONFIGURATIONS. Receptacles shall be intended only for flush installation, and plugs and connectors shall be either of the straight type (flexible cord exits at the rear of the device) or angled type (cord exits at an angle to the major plug axis) intended for field assembly on flexible cord.” [Emphasis added. NEMA Standard WD6 receptacle configuration designations "5-15, 6-15, 5-20, and 6-20" refer to the dimensional configurations for grounding-type, single-phase (i.e., 2-pole, 3-wire), 15- and 20-ampere, 125- and 250-volt, NONLOCKING-type receptacles.]

Consequently, the requirements must state that the REQUIRED receptacles are limited to 125-volt, 15- or 20-ampere, NONLOCKING-type receptacles that are listed Hospital Grade. The intent was to set requirements for the REQUIRED quantity of hospital grade receptacles and to permit separately that any other receptacles beyond those minimum numbers to be either of the nonlocking or locking type for design flexibility for specialized cord-and-plug-connected equipment.

Furthermore, inclusion of locking-type receptacles in 6.3.2.2.6.2(B) that inherently cannot be listed Hospital Grade represents a correlation conflict with the requirements of 6.3.2.2.6.1(C) that limit receptacles at patient bed locations in Category 1 to listed hospital grade.

Public Input No. 481-NFPA 99-2015 [Section No. 6.3.2.2.6.2]

6.3.2.2.6.2 Minimum Number of Receptacles.

The number of receptacles shall be determined by the intended use of the spaces in accordance with 6.3.2.2.6.2(A) through 6.3.2.2.6.2(F).

(A)

Receptacles for Patient Bed Locations in Category 2 Spaces. Each patient bed location shall be provided with a minimum of eight receptacles. They shall be permitted to be of the locking or nonlocking type, single, duplex, or quadruplex type, or any combination of the three. All receptacles shall be listed hospital grade.

(B)

Receptacles for Patient Bed Locations in Category 1 Spaces. Each patient bed location shall be provided with a minimum of 14 receptacles. They shall be permitted to be of the locking or nonlocking type, single, duplex, or quadruplex type, or any combination of the three. All receptacles shall be listed hospital grade.

(B1) Receptacles in pediatric bed locations shall be tamperproof.

(B2) For reliability reasons, 50% of the patient care receptacles shall be served by the normal power systems and 50% from the essential service power system

(C)

Receptacles for Operating Rooms. Operating rooms shall be provided with a minimum of 36 receptacles. They shall be permitted to be of the locking or nonlocking type, single, duplex, or quadruplex type, or any combination of the three. All receptacles shall be listed hospital grade.

(C1) In facilities with two essential power throw-over switches, OR's should have two isolated power sources – one served from each throwover switch. For reliability reasons, 50% of the receptacles in the OR shall be served by each isolated power system

(D)

Receptacles for Bathrooms or Toilets. Receptacles shall not be required in bathrooms or toilet rooms.

(E)

Receptacles for Special Rooms. Receptacles shall not be required in rooms where medical requirements mandate otherwise (e.g., certain psychiatric, pediatric, or hydrotherapy rooms).

(F)

Designated Pediatric Locations. Receptacles that are located within the patient rooms, bathrooms, playrooms, and activity rooms of pediatric units or spaces with similar risk as determined by the governing body, other than nurseries, shall be listed tamper-resistant or shall employ a listed tamper-resistant cover.

Statement of Problem and Substantiation for Public Input

Clarifications of patient safety concepts

Submitter Information Verification

Submitter Full Name: MICHAEL ANTHONY
Organization: UNIVERSITY OF MICHIGAN & University of Michigan Hospitals (James R. Harvey)
Affilliation: IEEE Education & Healthcare Facilities Committee
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 16:23:38 EDT 2015

Committee Statement

Resolution: FR-9-NFPA 99-2015

Statement: Many of the requirements of 6.3.2.2.6.2 relate to TYPES of receptacles rather than MINIMUM NUMBERS. This revision also removes redundant language from the final sentence of 6.3.2.2.6.2(A) for Category 1 spaces and relocates the similar requirement from Category 2 spaces and operating rooms in the final sentences of 6.3.2.2.6.2(B) and (C). References to receptacles being listed as "hospital grade" in those sections have been relocated for clarity to the code users. Similarly, 6.3.2.2.6.2(F) for tamper-resistant receptacles has been relocated to 6.3.2.2.6.1.

The requirements for Hospital Grade receptacles in UL Standard UL 498, Attachment Plugs and Receptacles, Supplement SD

are inherently limited by their nature to 125- and 250-volt, 15- and 20-ampere, NONLOCKING-type receptacles and CANNOT be applied to receptacles of the locking type. The Scope of UL 498, Attachment Plugs and Receptacles, Supplement SD, reads:

“SD1.1 The requirements of this supplement cover Hospital Grade attachment plugs, cord connectors, and receptacles, intended for hospital use in other than hazardous locations in accordance with Article 517 of the National Electrical Code, ANSI/NFPA 70. THEY ARE APPLICABLE ONLY TO NONLOCKING-TYPE DEVICES OF THE 5-15, 6-15, 5-20, AND 6-20 CONFIGURATIONS. Receptacles shall be intended only for flush installation, and plugs and connectors shall be either of the straight type (flexible cord exits at the rear of the device) or angled type (cord exits at an angle to the major plug axis) intended for field assembly on flexible cord.” [Emphasis added. NEMA Standard WD6 receptacle configuration designations "5-15, 6-15, 5-20, and 6-20" refer to the dimensional configurations for grounding-type, single-phase (i.e., 2-pole, 3-wire), 15- and 20-ampere, 125- and 250-volt, NONLOCKING-type receptacles.]

Consequently, the requirements must state that the REQUIRED receptacles are limited to 125-volt, 15- or 20-ampere, NONLOCKING-type receptacles that are listed Hospital Grade. The intent was to set requirements for the REQUIRED quantity of hospital grade receptacles and to permit separately that any other receptacles beyond those minimum numbers to be either of the nonlocking or locking type for design flexibility for specialized cord-and-plug-connected equipment.

Furthermore, inclusion of locking-type receptacles in 6.3.2.2.6.2(B) that inherently cannot be listed Hospital Grade represents a correlation conflict with the requirements of 6.3.2.2.6.1(C) that limit receptacles at patient bed locations in Category 1 to listed hospital grade.

Public Input No. 460-NFPA 99-2015 [Section No. 6.3.2.2.6.2(B)]

(B)

Receptacles for Patient Bed Locations in Category 1 Spaces. Each patient bed location shall be provided with a minimum of 14 receptacles. They shall be permitted to be of the locking or nonlocking type, single, duplex, or quadruplex type, or any combination of the three. All receptacles shall be listed hospital grade.This requirment shall not apply to operating rooms.

Statement of Problem and Substantiation for Public Input

this will clarify that you do not have to have 14 at the OR table and 36 in the room (total of 50)

Submitter Information Verification

Submitter Full Name: DAVID DAGENAIS
Organization: WENTWORTH-DOUGLASS HOSPITAL
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 15:31:58 EDT 2015

Committee Statement

Resolution: FR-9-NFPA 99-2015

Statement: Many of the requirements of 6.3.2.2.6.2 relate to TYPES of receptacles rather than MINIMUM NUMBERS. This revision also removes redundant language from the final sentence of 6.3.2.2.6.2(A) for Category 1 spaces and relocates the similar requirement from Category 2 spaces and operating rooms in the final sentences of 6.3.2.2.6.2(B) and (C). References to receptacles being listed as “hospital grade” in those sections have been relocated for clarity to the code users. Similarly, 6.3.2.2.6.2(F) for tamper-resistant receptacles has been relocated to 6.3.2.2.6.1.

The requirements for Hospital Grade receptacles in UL Standard UL 498, Attachment Plugs and Receptacles, Supplement SD are inherently limited by their nature to 125- and 250-volt, 15- and 20-ampere, NONLOCKING-type receptacles and CANNOT be applied to receptacles of the locking type. The Scope of UL 498, Attachment Plugs and Receptacles, Supplement SD, reads:

“SD1.1 The requirements of this supplement cover Hospital Grade attachment plugs, cord connectors, and receptacles, intended for hospital use in other than hazardous locations in accordance with Article 517 of the National Electrical Code, ANSI/NFPA 70. THEY ARE APPLICABLE ONLY TO NONLOCKING-TYPE DEVICES OF THE 5-15, 6-15, 5-20, AND 6-20 CONFIGURATIONS. Receptacles shall be intended only for flush installation, and plugs and connectors shall be either of the straight type (flexible cord exits at the rear of the device) or angled type (cord exits at an angle to the major plug axis) intended for field assembly on flexible cord.” [Emphasis added. NEMA Standard WD6 receptacle configuration designations "5-15, 6-15, 5-20, and 6-20" refer to the dimensional configurations for grounding-type, single-phase (i.e., 2-pole, 3-wire), 15- and 20-ampere, 125- and 250-volt, NONLOCKING-type receptacles.]

Consequently, the requirements must state that the REQUIRED receptacles are limited to 125-volt, 15- or 20-ampere, NONLOCKING-type receptacles that are listed Hospital Grade. The intent was to set requirements for the REQUIRED quantity of hospital grade receptacles and to permit separately that any other receptacles beyond those minimum numbers to be either of the nonlocking or locking type for design flexibility for specialized cord-and-plug-connected equipment.

Furthermore, inclusion of locking-type receptacles in 6.3.2.2.6.2(B) that inherently cannot be listed Hospital Grade represents a correlation conflict with the requirements of 6.3.2.2.6.1(C) that limit receptacles at patient bed locations in Category 1 to listed hospital grade.

Public Input No. 163-NFPA 99-2015 [Section No. 6.3.2.2.6.2(F)]

(F)

Designated Pediatric Locations. Receptacles that are located within the patient rooms, bathrooms, playrooms, and activity rooms of pediatric units ~~or spaces with similar risk as determined by the governing body~~, other than nurseries, shall be listed tamper-resistant or shall employ a listed tamper-resistant cover.

Statement of Problem and Substantiation for Public Input

Facilities have been cited by AHJs for not having tamper resistant receptacles in areas outside of pediatric units based on the verbage that is shown deleted. If the technical committee wants a risk assessment done to determine what locations outside of pediatric units need tamper resistant receptacles, it is suggested that a requirement for a risk assessment be specifically added to NFPA 99. However, the way it reads now, "spaces with simlar risk as determined by the governing body" doesn't actually require an assessment to be done, nor does NFPA 70 require tamper resistant receptacles to be installed in those other risky areas (except child care centers). When researching how the proposed deleted wording got into the code, there did not appear to be any substantiation provided in the First Revision to understand what the intent of the committee is with respect to the wording.

Submitter Information Verification

Submitter Full Name: PETER LARRIMER
Organization: US DEPARTMENT OF VETERANS AFFA
Street Address:
City:
State:
Zip:
Submittal Date: Tue May 26 09:56:41 EDT 2015

Committee Statement

Resolution: FR-9-NFPA 99-2015

Statement: Many of the requirements of 6.3.2.2.6.2 relate to TYPES of receptacles rather than MINIMUM NUMBERS. This revision also removes redundant language from the final sentence of 6.3.2.2.6.2(A) for Category 1 spaces and relocates the similar requirement from Category 2 spaces and operating rooms in the final sentences of 6.3.2.2.6.2(B) and (C). References to receptacles being listed as “hospital grade” in those sections have been relocated for clarity to the code users. Similarly, 6.3.2.2.6.2(F) for tamper-resistant receptacles has been relocated to 6.3.2.2.6.1.

The requirements for Hospital Grade receptacles in UL Standard UL 498, Attachment Plugs and Receptacles, Supplement SD are inherently limited by their nature to 125- and 250-volt, 15- and 20-ampere, NONLOCKING-type receptacles and CANNOT be applied to receptacles of the locking type. The Scope of UL 498, Attachment Plugs and Receptacles, Supplement SD, reads:

“SD1.1 The requirements of this supplement cover Hospital Grade attachment plugs, cord connectors, and receptacles, intended for hospital use in other than hazardous locations in accordance with Article 517 of the National Electrical Code, ANSI/NFPA 70. THEY ARE APPLICABLE ONLY TO NONLOCKING-TYPE DEVICES OF THE 5-15, 6-15, 5-20, AND 6-20 CONFIGURATIONS. Receptacles shall be intended only for flush installation, and plugs and connectors shall be either of the straight type (flexible cord exits at the rear of the device) or angled type (cord exits at an angle to the major plug axis) intended for field assembly on flexible cord.” [Emphasis added. NEMA Standard WD6 receptacle configuration designations "5-15, 6-15, 5-20, and 6-20" refer to the dimensional configurations for grounding-type, single-phase (i.e., 2-pole, 3-wire), 15- and 20-ampere, 125- and 250-volt, NONLOCKING-type receptacles.]

Consequently, the requirements must state that the REQUIRED receptacles are limited to 125-volt, 15- or 20-ampere, NONLOCKING-type receptacles that are listed Hospital Grade. The intent was to set requirements for the REQUIRED quantity of hospital grade receptacles and to permit separately that any other receptacles beyond those minimum numbers to be either of the nonlocking or locking type for design flexibility for specialized cord-and-plug-connected equipment.

Furthermore, inclusion of locking-type receptacles in 6.3.2.2.6.2(B) that inherently cannot be listed Hospital Grade represents a correlation conflict with the requirements of 6.3.2.2.6.1(C) that limit receptacles at patient bed locations in Category 1 to listed hospital grade.

Public Input No. 17-NFPA 99-2015 [Section No. 6.3.2.2.6.2(F)]

(F)

Designated Pediatric Locations. Receptacles that are located within the patient rooms, bathrooms, playrooms, and activity rooms of pediatric units or spaces with similar risk as determined by the governing body, other than infant nurseries, shall be listed tamper-resistant or shall employ a listed tamper-resistant cover.

Statement of Problem and Substantiation for Public Input

The purpose of tamper-resistant receptacles is to reduce shock and burn injuries to mobile toddlers and young children. Often, visitors to maternity areas are accompanied by toddlers and young children. During such visits, the focus is on the mother and newborn infant, and less so on those accompanying youngster under the presumption that visitor-accessible spaces of healthcare facilities are inherently free from hazards. The curiosity factor of a healthcare environment and of novel medical equipment is in fact quite the opposite.

Wholesale exclusion of ALL “nurseries” WITHOUT FURTHER QUALIFICATION from requiring installation of tamper-resistant receptacles aggravates this risk to toddlers and youngsters. Neither the National Electrical Code® nor NFPA 99 defines the term “nursery”. Per 3.2.1.2 of the Manual of Style for NFPA Technical Committee Documents, definitions of general terms shall follow Webster’s Collegiate Dictionary. There, “nursery” is broadly defined as “a place where children are temporarily cared for in their parents' absence”, NOT as a space for the care exclusively of newborn patients.

Adding the qualifier "infant" [as is already done in 6.4.2.2.4.2(3)(a)], or alternatively "neonatal", in front of the word "nurseries” in this requirement would preclude relaxation of tamper resistance requirements being extended to generically-defined "nurseries" intended for older, mobile toddlers and children who would then be subject to unwarranted compromise of safety.

Submitter Information Verification

Submitter Full Name: BRIAN ROCK
Organization: HUBBELL INCORPORATED
Street Address:
City:
State:
Zip:
Submittal Date: Sun Mar 22 11:42:13 EDT 2015

Committee Statement

Resolution: FR-9-NFPA 99-2015

Statement: Many of the requirements of 6.3.2.2.6.2 relate to TYPES of receptacles rather than MINIMUM NUMBERS. This revision also removes redundant language from the final sentence of 6.3.2.2.6.2(A) for Category 1 spaces and relocates the similar requirement from Category 2 spaces and operating rooms in the final sentences of 6.3.2.2.6.2(B) and (C). References to receptacles being listed as “hospital grade” in those sections have been relocated for clarity to the code users. Similarly, 6.3.2.2.6.2(F) for tamper-resistant receptacles has been relocated to 6.3.2.2.6.1.

The requirements for Hospital Grade receptacles in UL Standard UL 498, Attachment Plugs and Receptacles, Supplement SD are inherently limited by their nature to 125- and 250-volt, 15- and 20-ampere, NONLOCKING-type receptacles and CANNOT be applied to receptacles of the locking type. The Scope of UL 498, Attachment Plugs and Receptacles, Supplement SD, reads:

“SD1.1 The requirements of this supplement cover Hospital Grade attachment plugs, cord connectors, and receptacles, intended for hospital use in other than hazardous locations in accordance with Article 517 of the National Electrical Code, ANSI/NFPA 70. THEY ARE APPLICABLE ONLY TO NONLOCKING-TYPE DEVICES OF THE 5-15, 6-15, 5-20, AND 6-20 CONFIGURATIONS. Receptacles shall be intended only for flush installation, and plugs and connectors shall be either of the straight type (flexible cord exits at the rear of the device) or angled type (cord exits at an angle to the major plug axis) intended for field assembly on flexible cord.” [Emphasis added. NEMA Standard WD6 receptacle configuration designations "5-15, 6-15, 5-20, and 6-20" refer to the dimensional configurations for grounding-type, single-phase (i.e., 2-pole, 3-wire), 15- and 20-ampere, 125- and 250-volt, NONLOCKING-type receptacles.]

Consequently, the requirements must state that the REQUIRED receptacles are limited to 125-volt, 15- or 20-ampere, NONLOCKING-type receptacles that are listed Hospital Grade. The intent was to set requirements for the REQUIRED quantity of hospital grade receptacles and to permit separately that any other receptacles beyond those minimum numbers to be either of the nonlocking or locking type for design flexibility for specialized cord-and-plug-connected equipment.

Furthermore, inclusion of locking-type receptacles in 6.3.2.2.6.2(B) that inherently cannot be listed Hospital Grade represents a correlation conflict with the requirements of 6.3.2.2.6.1(C) that limit receptacles at patient bed locations in Category 1 to

listed hospital grade.

Public Input No. 463-NFPA 99-2015 [Section No. 6.3.2.2.6.2(F)]

(F)

Designated Pediatric Locations. Receptacles that are located within the patient rooms, bathrooms, playrooms, and activity rooms of pediatric units or spaces with similar risk as determined by the governing body by conducting a risk assesment , ~~other~~ other than nurseries, shall be listed tamper-resistant or shall employ a listed tamper-resistant cover.

Statement of Problem and Substantiation for Public Input

some AHJs feel that this requires a risk assessment for every room .

Submitter Information Verification

Submitter Full Name: DAVID DAGENAIS
Organization: WENTWORTH-DOUGLASS HOSPITAL
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 15:43:13 EDT 2015

Committee Statement

Resolution: FR-9-NFPA 99-2015

Statement: Many of the requirements of 6.3.2.2.6.2 relate to TYPES of receptacles rather than MINIMUM NUMBERS. This revision also removes redundant language from the final sentence of 6.3.2.2.6.2(A) for Category 1 spaces and relocates the similar requirement from Category 2 spaces and operating rooms in the final sentences of 6.3.2.2.6.2(B) and (C). References to receptacles being listed as “hospital grade” in those sections have been relocated for clarity to the code users. Similarly, 6.3.2.2.6.2(F) for tamper-resistant receptacles has been relocated to 6.3.2.2.6.1.

The requirements for Hospital Grade receptacles in UL Standard UL 498, Attachment Plugs and Receptacles, Supplement SD are inherently limited by their nature to 125- and 250-volt, 15- and 20-ampere, NONLOCKING-type receptacles and CANNOT be applied to receptacles of the locking type. The Scope of UL 498, Attachment Plugs and Receptacles, Supplement SD, reads:

“SD1.1 The requirements of this supplement cover Hospital Grade attachment plugs, cord connectors, and receptacles, intended for hospital use in other than hazardous locations in accordance with Article 517 of the National Electrical Code, ANSI/NFPA 70. THEY ARE APPLICABLE ONLY TO NONLOCKING-TYPE DEVICES OF THE 5-15, 6-15, 5-20, AND 6-20 CONFIGURATIONS. Receptacles shall be intended only for flush installation, and plugs and connectors shall be either of the straight type (flexible cord exits at the rear of the device) or angled type (cord exits at an angle to the major plug axis) intended for field assembly on flexible cord.” [Emphasis added. NEMA Standard WD6 receptacle configuration designations "5-15, 6-15, 5-20, and 6-20" refer to the dimensional configurations for grounding-type, single-phase (i.e., 2-pole, 3-wire), 15- and 20-ampere, 125- and 250-volt, NONLOCKING-type receptacles.]

Consequently, the requirements must state that the REQUIRED receptacles are limited to 125-volt, 15- or 20-ampere, NONLOCKING-type receptacles that are listed Hospital Grade. The intent was to set requirements for the REQUIRED quantity of hospital grade receptacles and to permit separately that any other receptacles beyond those minimum numbers to be either of the nonlocking or locking type for design flexibility for specialized cord-and-plug-connected equipment.

Furthermore, inclusion of locking-type receptacles in 6.3.2.2.6.2(B) that inherently cannot be listed Hospital Grade represents a correlation conflict with the requirements of 6.3.2.2.6.1(C) that limit receptacles at patient bed locations in Category 1 to listed hospital grade.

Public Input No. 484-NFPA 99-2015 [Section No. 6.3.2.2.6.3]

6.3.2.2.6.3 Polarity of Receptacles.

Each receptacle shall be wired in accordance with *NFPA 70*, *National Electrical Code*, to ensure correct polarity. For safety reasons, whenever possible, the ground prong shall be in the up position (If receptacle is not fully inserted, and something falls, it hits the groung prong not neutral or hot)

Statement of Problem and Substantiation for Public Input

Safety recommendadtion that should be self-evident.

Submitter Information Verification

Submitter Full Name: MICHAEL ANTHONY
Organization: UNIVERSITY OF MICHIGAN & University of Michigan Hospitals (James R. Harvey)
Affilliation: IEEE Education & Healthcare Facilities Committee
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 16:29:23 EDT 2015

Committee Statement

Resolution: FR-9-NFPA 99-2015

Statement: Many of the requirements of 6.3.2.2.6.2 relate to TYPES of receptacles rather than MINIMUM NUMBERS. This revision also removes redundant language from the final sentence of 6.3.2.2.6.2(A) for Category 1 spaces and relocates the similar requirement from Category 2 spaces and operating rooms in the final sentences of 6.3.2.2.6.2(B) and (C). References to receptacles being listed as “hospital grade” in those sections have been relocated for clarity to the code users. Similarly, 6.3.2.2.6.2(F) for tamper-resistant receptacles has been relocated to 6.3.2.2.6.1.

The requirements for Hospital Grade receptacles in UL Standard UL 498, Attachment Plugs and Receptacles, Supplement SD are inherently limited by their nature to 125- and 250-volt, 15- and 20-ampere, NONLOCKING-type receptacles and CANNOT be applied to receptacles of the locking type. The Scope of UL 498, Attachment Plugs and Receptacles, Supplement SD, reads:

“SD1.1 The requirements of this supplement cover Hospital Grade attachment plugs, cord connectors, and receptacles, intended for hospital use in other than hazardous locations in accordance with Article 517 of the National Electrical Code, ANSI/NFPA 70. THEY ARE APPLICABLE ONLY TO NONLOCKING-TYPE DEVICES OF THE 5-15, 6-15, 5-20, AND 6-20 CONFIGURATIONS. Receptacles shall be intended only for flush installation, and plugs and connectors shall be either of the straight type (flexible cord exits at the rear of the device) or angled type (cord exits at an angle to the major plug axis) intended for field assembly on flexible cord.” [Emphasis added. NEMA Standard WD6 receptacle configuration designations "5-15, 6-15, 5-20, and 6-20" refer to the dimensional configurations for grounding-type, single-phase (i.e., 2-pole, 3-wire), 15- and 20-ampere, 125- and 250-volt, NONLOCKING-type receptacles.]

Consequently, the requirements must state that the REQUIRED receptacles are limited to 125-volt, 15- or 20-ampere, NONLOCKING-type receptacles that are listed Hospital Grade. The intent was to set requirements for the REQUIRED quantity of hospital grade receptacles and to permit separately that any other receptacles beyond those minimum numbers to be either of the nonlocking or locking type for design flexibility for specialized cord-and-plug-connected equipment.

Furthermore, inclusion of locking-type receptacles in 6.3.2.2.6.2(B) that inherently cannot be listed Hospital Grade represents a correlation conflict with the requirements of 6.3.2.2.6.1(C) that limit receptacles at patient bed locations in Category 1 to listed hospital grade.

Public Input No. 316-NFPA 99-2015 [Section No. 6.3.2.2.7.1]

6.3.2.2.7.1* Use of Isolated Ground Receptacles, Relocatable Power Taps, and Health Care Outlet Assemblies .

(A)

An isolated ground receptacle, if used, shall not defeat the purposes of the safety features of the grounding systems detailed herein.

(B)

An isolated ground receptacle shall not be installed within a patient care vicinity.

Relocatable power taps shall not serve electrical equipment within a patient care space.

A listed health care outlet assembly shall be permitted to serve electrical equipment in patient care spaces outside of patient care vicinities. A listed health care outlet assembly that is also connected to the patient equipment grounding point shall be permitted to serve electrical equipment within a patient care vicinity.

Statement of Problem and Substantiation for Public Input

Relocatable Power Taps (RPTs) are not to be used with medical equipment in patient care areas. This includes critical areas such as operating rooms, recovery areas, intensive care areas, and non-critical patient care areas such as patient rooms, diagnostic areas, exam areas.

Relocatable power taps (RPT), sometimes called power strips, are used to supply power to portable electric devices. They consist of an attachment plug with a flexible cord that terminates to an enclosure where one or more receptacles are mounted. They may include supplementary overcurrent protection, switches and indicator lights, surge protection capability, and in some cases connections for coaxial cable (TV/CATV), data communications, telephone, or antenna. RPTs are evaluated for general-use applications in accordance with UL Standard UL 1363, Relocatable Power Taps. RPTs with surge protection capability are additionally evaluated for general-use applications in accordance with UL Standard UL 1449, Surge Protective Devices.

Receptacles in patient care vicinities are required to connected to two effective grounding paths. Isolated ground receptacles inherently cannot be connected to two grounding paths and are not permitted within patient care vicinities. Similar to isolated ground receptacles on fixed wiring, cord-connected RPTs also cannot provide that dual-fed grounding conductor required to provide two effective grounding paths from the RPT's receptacles.

Relocatable power taps may not be used as a substitute for adequate electrical outlets (fixed receptacles) in a health care facility. RPTs however may be used for non-patient care equipment such as computers/monitors/printers, and in areas such as waiting rooms, offices, nurse stations, support areas, corridors, etc. Precautions needed if RPTs are used include:
• ensuring RPTs are never “daisy-chained” (connecting one RPT to another or to an extension cord), preventing cords from becoming tripping hazards;
• installing ground-fault circuit-interrupter (GFCI) and overcurrent protection devices, and
• using RPTs that are adequate for the number and types of devices used.
Overload on any circuit can potentially cause overheating and fire. The use of ground-fault circuit interruption (GFCI) may be required in locations near water sources to prevent electrocution of the occupants.

There are RPTs that incorporate hospital grade plugs and receptacles and that may be acceptable outside the patient care spaces. Indeed, UL Standards UL 1363 and UL 1449 mandate that such RPTs be marked “CAUTION: Risk of Electric Shock – Do not use in General Patient Care Areas or Critical Patient Care Areas. This relocatable power tap [or surge protective device] has not been evaluated for use where Article 517 of the National Electrical Code requires Hospital Grade components.” Although such RPTs offer improved reliability of grounding continuity inherent with hospital grade plugs and receptacles, these RPTs have not been evaluated for the low levels of leakage current and touch voltage required in patient care spaces.

Medical equipment is used to diagnose, treat, or monitor a patient, and makes physical or electrical contact with the patient and/or transfers energy to or from the patient, and/or detects such energy transfer to or from the patient. RPTs are not to be used with medical equipment in patient care spaces. These includes critical care spaces such as operating rooms, recovery areas, intensive care areas, and non-critical patient general care spaces such as patient rooms, diagnostic areas, exam areas, etc.

There is a separate category called Special Purpose Relocatable Power Taps [SPRTPs] that are certified (“Recognized”) SOLELY as COMPONENTS for use within MODEL-SPECIFIC equipment assemblies such as data entry pedestals, monitor carts, etc. that are themselves “Listed” as complete equipment assemblies. As indicated in UL’s Online Directory for SPRPTs [category XBZN2]:
“The devices covered under this category are incomplete in certain constructional features or restricted in performance capabilities and are intended for use as components of complete equipment submitted for investigation rather than for direct separate installation in the field. THE FINAL ACCEPTANCE OF THE COMPONENT IS DEPENDENT UPON ITS INSTALLATION AND USE IN COMPLETE EQUIPMENT SUBMITTED TO UL.”
Such SPRPTs are evaluated for limited component applications in accordance with UL Outline Of Investigation Subject 1363A, Special Purpose Relocatable Power Taps. Although SPRPTs incorporate hospital grade plugs and receptacles and may suitable SOLELY AS COMPONENTS OF LISTED EQUIPMENT ASSEMBLIES for use within general and critical care areas, they do NOT comply with NFPA 70 National Electrical Code® Section 517.13 requirements for an acceptable grounding return path. As such, SPRPTs are NOT suitable for use within Patient Care Vicinities, as defined by NFPA 99 and by NFPA 70 National Electrical Code®.

RPTs that include MOV surge protection between the grounded conductor and the grounding conductor and between the ungrounded conductor and the grounding conductor pose an additional hazard. As the MOVs are expended and approach end-of-life failures, leakage current to the grounding conductor increases. Such leakage current can harm patients in weakened condition. Furthermore, MOVs connected between the grounded conductor and the grounding conductor have no follow-through current to blow open protective fuse that would disable leakage current to ground.

The Joint Commission (TJC) had brought the issues of RPT's to the Healthcare Interpretation Task Force (HITF) where the Minutes (no formal interpretation was created) from December 2007 stated "NFPA 70, NFPA 99 and NFPA 101 all have regulations that control the electrical components and equipment in a patient room. It appears that it is the intent of these documents to restrict RPT use so that it is general-use RPTs are not used in conjunction with medical equipment." To be consistent with Centers for Medicare and Medicaid Services (CMS), The Joint Commission (TJC) asked CMS regarding their position, which is "RPTs are not to be used with medical equipment in patient care areas. This includes critical areas such as operating rooms, recovery areas, intensive care areas, and non-critical patient care areas such as patient rooms, diagnostic areas, exam areas, etc."

Hubbell Incorporated has funded Underwriters Laboratories (UL) to develop requirements into a draft standard, Outline Of Investigation UL 2830, Heath Care Outlet Assemblies, that would allow Listing of such cord-connected health care outlet assemblies (HCOAs) by addressing the safety deficiencies of RPTs and SPRPTs in the operating environment of health care facilities. To generalize requirements, the Scope of draft UL 2830 reads:

"These requirements cover indoor-use cord-and-plug-connected Health Care Facility receptacle outlet assemblies (HCOA) rated 250 V AC or less and 20 Amperes or less. HCOA are for use as a movable power supply connection for cord-and-plug-connected medical electrical utilization equipment in accordance with the National Electric Code, NFPA 70, Article 517 Health Care Facilities, for use in General Patient Care Areas or Critical Patient Care Areas, including Patient Care Vicinities equipped with Patient Equipment Grounding Points. HCOAs intended for such use shall comply with applicable requirements of the Standard for Safety of Medical Electrical Equipment, Part 1: General Requirements, UL 60601-1, the Standard for Safety Requirements for Medical Electrical Systems, IEC 60601-1-1 and the Standard for Medical Electrical Equipment-Part 1-2: General Requirements for basic safety and essential performance-Collateral standard: Electromagnetic compatibility-Requirements and tests, ANSI/AAMI/IEC 60601-1-2:2007/(R) 2012.

"These requirements cover HCOA consisting of a NEMA configuration Hospital Grade attachment plug and a length of non detachable flexible cord terminated in an enclosure in which are mounted Hospital Grade individual receptacle outlets which are connected conductively to an integral protective earth terminal provided for user connection of a return grounding path to patient equipment grounding points located in the Health Care Facility."

Requirements will also limit leakage current to low levels mandated for medical equipment in accordance with UL 60601-1. Power supply cords are to be sized to preclude the need for supplementary overcurrent protectors and power switches in HCOAs and thereby preclude power disruptions to essential medical equipment by inadvertent operation supplementary overcurrent protectors and power switches of misapplied RPTs. Closure lids will caution that connected equipment is to be solely those authorized by the governing body of the health care facility.

Submitter Information Verification

Submitter Full Name: BRIAN ROCK
Organization: HUBBELL INCORPORATED
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jul 02 14:59:04 EDT 2015

Committee Statement

Resolution: As of right now, the committee's understanding is that the purview of relocatable power taps falls under the jurisdiction of HEA-MED. Chapter 6 is not the appropriate location for such a prohibition.

Public Input No. 392-NFPA 99-2015 [Section No. 6.3.2.2.7.1]

6.3.2.2.7.1* Use of Isolated Ground Receptacles.

(A)

An isolated ground receptacle, if used, shall not defeat the purposes of the safety features of the grounding systems detailed ~~herein.~~ in **6.3.2.2.2.4** . .

(B)

An isolated ground receptacle shall not be installed within a patient care vicinity.

(C) Isolated grounding receptacles installed in branch circuits for patient care spaces shall be connected to an insulated equipment grounding conductor in accordance with *NFPA 70, National Electrical Code* , 250.146(D) in addition to the two equipment grounding conductor paths required in **6.3.2.2.2.4** .

(D) The equipment grounding conductor installed for isolated grounding receptacles in patient care areas shall be clearly identified using green insulation with one or more yellow stripes along its entire length.

Statement of Problem and Substantiation for Public Input

Various recent Standards Council decisions have clearly established that NFPA 99, Health Care Facilities Code, is a performance code. These same Standards Council decisions have clearly established NFPA 70, National Electrical Code, as an installation code. This is consistent with each document's published scope. With this clear delineation established, NFPA 99, a performance code, cannot modify NFPA 70, an installation code. This modification cannot occur because NFPA 99, as a performance code, does not have jurisdiction over installation elements found in NFPA 70, or any other NFPA installation code. For this reason, certain elements of NFPA 70 must be written in NFPA 99.
NFPA 70: National Electrical Code 2014 517.19 contains language similar to what is show above. This language should be contained in NFPA 99 as direction for design and installation requirements when isolated ground receptacles are installed in patent care spaces outside the patient care vicinity.

Confusion exists regarding the number of equipment grounding conductors that must be installed for isolated ground receptacles installed outside the patient care vicinity in a patient care spaces. As submitter of this proposal I personally inspected three separate isolated grounding receptacle installations in recently remodeled patient care spaces at three separate hospitals. All three installations used EMT raceway and a separate 12 AWG insulated EGC as required by NFPA 70 section 517.13 (A) and (B). The EGC required by NFPA 70 section 517.13(B) was utilized as the isolated grounding conductor. No other separate equipment grounding conductors were installed. These installations were all in violation of NFPA 70 sections 250.146(D) and 517.13. This proposal will clarify to installers and inspectors the need for three grounding paths when IG receptacles are required, i.e. metal raceway path and green wire type equipment grounding conductor, and a separate IG equipment grounding conductor to comply with NFPA 70 section 250.146(D).

Conductor color requirements for the Isolated Grounding Conductor using and insulated conductor of green with one or more yellow stripes are established to provide clear and distinct installation requirements from the Equipment Grounding Conductor associated with the revised PI requested in 6.3.2.2.2.4.

The proposed addition to NFPA 99 provides clarifies for designers, installers, and maintenance personnel what is required to satisfy the equipment grounding conductor requirements for branch circuits serving these areas where the isolated equipment grounding conductor and IG receptacles are specified. The proposal clarifies two requirements that clearly distinguish the identification requirement from the number of equipment grounding conductors required for this type of installation.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 394-NFPA 99-2015 [Section No. 6.3.2.2.2.4]	

Submitter Information Verification

Submitter Full Name: GARY BECKSTRAND
Organization: UTAH ELECTRICAL JATC
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jul 05 13:00:36 EDT 2015

Committee Statement

Resolution: FR-9-NFPA 99-2015

Statement: Many of the requirements of 6.3.2.2.6.2 relate to TYPES of receptacles rather than MINIMUM NUMBERS. This revision also removes redundant language from the final sentence of 6.3.2.2.6.2(A) for Category 1 spaces and relocates the similar requirement from Category 2 spaces and operating rooms in the final sentences of 6.3.2.2.6.2(B) and (C). References to receptacles being listed as “hospital grade” in those sections have been relocated for clarity to the code users. Similarly, 6.3.2.2.6.2(F) for tamper-resistant receptacles has been relocated to 6.3.2.2.6.1.

The requirements for Hospital Grade receptacles in UL Standard UL 498, Attachment Plugs and Receptacles, Supplement SD are inherently limited by their nature to 125- and 250-volt, 15- and 20-ampere, NONLOCKING-type receptacles and CANNOT be applied to receptacles of the locking type. The Scope of UL 498, Attachment Plugs and Receptacles, Supplement SD, reads:

“SD1.1 The requirements of this supplement cover Hospital Grade attachment plugs, cord connectors, and receptacles, intended for hospital use in other than hazardous locations in accordance with Article 517 of the National Electrical Code, ANSI/NFPA 70. THEY ARE APPLICABLE ONLY TO NONLOCKING-TYPE DEVICES OF THE 5-15, 6-15, 5-20, AND 6-20 CONFIGURATIONS. Receptacles shall be intended only for flush installation, and plugs and connectors shall be either of the straight type (flexible cord exits at the rear of the device) or angled type (cord exits at an angle to the major plug axis) intended for field assembly on flexible cord.” [Emphasis added. NEMA Standard WD6 receptacle configuration designations "5-15, 6-15, 5-20, and 6-20" refer to the dimensional configurations for grounding-type, single-phase (i.e., 2-pole, 3-wire), 15- and 20-ampere, 125- and 250-volt, NONLOCKING-type receptacles.]

Consequently, the requirements must state that the REQUIRED receptacles are limited to 125-volt, 15- or 20-ampere, NONLOCKING-type receptacles that are listed Hospital Grade. The intent was to set requirements for the REQUIRED quantity of hospital grade receptacles and to permit separately that any other receptacles beyond those minimum numbers to be either of the nonlocking or locking type for design flexibility for specialized cord-and-plug-connected equipment.

Furthermore, inclusion of locking-type receptacles in 6.3.2.2.6.2(B) that inherently cannot be listed Hospital Grade represents a correlation conflict with the requirements of 6.3.2.2.6.1(C) that limit receptacles at patient bed locations in Category 1 to listed hospital grade.

Public Input No. 462-NFPA 99-2015 [Section No. 6.3.2.2.8.2]

6.3.2.2.8.2

This special protection shall be provided as follows:

(1) Power distribution system that inherently limits the possible ground-fault current due to a first fault to a low value, without interrupting the power supply

(2) Power distribution system in which the power supply is interrupted if the ground-fault current does, in fact, exceed the trip value of ~~a Class A GFCI~~ 6 MA

Statement of Problem and Substantiation for Public Input

This is the term used in the NEC

Submitter Information Verification

Submitter Full Name: DAVID DAGENAIS
Organization: WENTWORTH-DOUGLASS HOSPITAL
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 15:38:34 EDT 2015

Committee Statement

Resolution: The proposed revision is not enforceable as restated. The definition in Article 100 of NFPA 70, National Electrical Code® for Ground-Fault Circuit Interrupter (GFCI) is for Class A protection. The 6 mA maximum trip value is indicated in a nonmandatory Informative Note. Listed GFCIs are identified as Class A, making the requirement enforceable; the 6 mA maximum trip value is not identified on the device. As the submitter has pointed out, there is a discrepancy between NFPA 99 and 517.20(A)(2), this should be changed in Article 517.20, not here.

Public Input No. 465-NFPA 99-2015 [Section No. 6.3.2.2.8.4]

~~6.3.2.2.8.4~~ * - –

~~Operating rooms shall be considered to be a wet procedure location, unless a risk assessment conducted by the health care governing body determines otherwise.~~

Statement of Problem and Substantiation for Public Input

this has confused many AHJs and some AHJs don't agree with the hospital risking them out. By having the ORs risk in like other wet procurer location it will be consistent,

Submitter Information Verification

Submitter Full Name: DAVID DAGENAIS
Organization: WENTWORTH-DOUGLASS HOSPITAL
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 15:45:16 EDT 2015

Committee Statement

Resolution: The issue raised by the submitter is being addressed in action to a new 6.3.2.2.8.5.

Public Input No. 376-NFPA 99-2015 [Section No. 6.3.2.2.8.5]

~~6.3.2.2.8.5~~ –

~~In existing construction, the requirements of 6.3.2.2.8.1 shall not be required when a written inspection procedure, acceptable to the authority having jurisdiction, is performed by a designated individual at the hospital to indicate that equipment grounding conductors for 120-V, single-phase, 15-A and 20-A receptacles; equipment connected by cord and plug; and fixed electrical equipment are installed and maintained in accordance with *NFPA 70* , *National Electrical Code* , and the applicable performance requirements of this chapter.~~

~~(A)~~ –

~~The procedure shall include electrical continuity tests of all required equipment, grounding conductors, and their connections.~~

~~(B)~~ –

~~Fixed receptacles, equipment connected by cord and plug, and fixed electrical equipment shall be tested as follows:~~

(1) ~~When first installed~~

(2) ~~Where there is evidence of damage~~

(3) ~~After any repairs~~

Statement of Problem and Substantiation for Public Input

Wet Procedure Locations have been recognized as hazardous locations requiring special protection for workers and patients for some time. The hazards of using electricity in areas where water is present as a matter of operations is well documented. OSHA requires construction to provide ground fault circuit interrupter protection for personnel. Articles 553, 555, and 680 of the National Electrical Code provide increased protections for Floating Buildings, Marinas and Boatyards, and Swimming Pools, Fountains and Similar Installations – all of which acknowledge and mitigate the special hazards associated with the use of line voltage electricity in a wet environment. These well-documented hazards imposed on hospital personnel and patients in health care facilities are not somehow abated because of the age of the building. Workers and patients should not be exposed to the hazards of line voltage electricity in a wet procedure location. When one considers these hazards can be mitigated with low cost, proven technology, such as ground fault circuit interrupters; it becomes prudent and right to provide proven protection for all Wet Procedure Locations found in any Health Care Facility.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 378-NFPA 99-2015 [Section No. 6.1.2]	

Submitter Information Verification

Submitter Full Name: STEPHEN LIPSTER
Organization: THE ELECTRICAL TRADES CENTER
Affilliation: IBEW
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jul 05 12:26:19 EDT 2015

Committee Statement

Resolution: This is a design consideration that may not have been required for all facilities at the time of installation. Design and performance requirements should not be listed in the retroactive section. For PI 376, section 6.3.2.2.8.5 allows a means for existing facilities to manage wet procedure locations where protection against ground fault was not provided in the original construction.

Public Input No. 44-NFPA 99-2015 [Section No. 6.3.2.2.8.5 [Excluding any Sub-Sections]]

In existing construction, the requirements of 6.3.2.2.8.1 shall not be required when a written inspection procedure, acceptable to the authority having jurisdiction, is performed by a designated individual at the hospital to indicate that equipment grounding conductors for 120-V, single-phase, 15-A and 20-A receptacles; ~~equipment connected by cord and plug; and fixed electrical equipment~~ are installed and maintained in accordance with *NFPA 70*, *National Electrical Code*, and the applicable performance requirements of this chapter.

Additional Proposed Changes

File Name	Description	Approved
PC_73_ELS.pdf	NFPA 99_PC73	

Statement of Problem and Substantiation for Public Input

NOTE: The following Public Input appeared as “Reject but Hold” in Public Comment No. 73 of the (A2014) Second Draft Report for NFPA 99 and per the Regs. At 4.4.8.3.1.
Both "equipment connected by cord and plug and fixed electrical equipment" are not within the purview of the Electrical Systems Technical Committee. They are in the purview of the Medical Equipment Technical Committee (of which I am the chair).Chapter 10 (specifically section 10.5.2.1) adequately covers any needed inspection of "equipment connected by cord and plug and fixed electrical equipment" whether or not the equipment is located within a Wet Procedure Location.The Electrical Systems Technical Committee provided no technical documentation whatsoever for including this requirement for "equipment connected by cord and plug and fixed electrical equipment" in the Chapter 10 of 2012 edition. I regret that nobody caught this jurisdictional conflict during the 2012 process, but now is the time to correct it.

Submitter Information Verification

Submitter Full Name: TC ON HEA-ELS
Organization: NFPA
Street Address:
City:
State:
Zip:
Submittal Date: Thu Apr 09 13:56:21 EDT 2015

Committee Statement

Resolution: The ELS TC should retain these requirements for the unique application in wet procedure locations.

Public Input No. 497-NFPA 99-2015 [Section No. 6.3.2.2.8.5 [Excluding any Sub-Sections]]

~~In existing construction, the requirements of 6.3.2.2.8.1 shall not be required when a written inspection procedure, acceptable to the authority having jurisdiction, is performed by a designated individual at the hospital to indicate that equipment grounding conductors for 120-V, single-phase, 15-A and 20-A receptacles; equipment connected by cord and plug; and fixed electrical equipment are installed and maintained in accordance with *NFPA 70* , *National Electrical Code* , and the applicable performance requirements of this chapter.~~

Statement of Problem and Substantiation for Public Input

This section directly contradicts 6.3.2.2.8.7 which is already designated to apply to existing facilities in section 6.1.2. This is an exception to 6.3.2.2.8.1 not for 6.3.2.2.8.4 which applies to operating rooms. The removal of this section will not have an effect on the requirements for existing operating rooms.
Sub-paragraphs (A) and (B) should also be deleted.

Submitter Information Verification

Submitter Full Name: JASON DANTONA
Organization: THOMPSON CONSULTANTS INC
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 16:44:34 EDT 2015

Committee Statement

Resolution: Section 6.3.2.2.8.5 allows a means for existing facilities to manage wet procedure locations where protection against ground fault was not provided in the original construction.

Public Input No. 476-NFPA 99-2015 [Section No. 6.3.2.2.10.1]

6.3.2.2.10.1

Category 1 spaces shall be served ~~only~~ by a Type 1 EES.

Statement of Problem and Substantiation for Public Input

The revision of this requirements clarifies the allowance of normal circuits to serve Category I spaces as described in 6.3.2.2.1.2. The word "only" in 6.3.2.2.10.1 could be misinterpreted to conflict with 6.3.2.2.1.2.

Submitter Information Verification

Submitter Full Name: JASON DANTONA
Organization: THOMPSON CONSULTANTS INC
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 16:17:16 EDT 2015

Committee Statement

Resolution: FR-11-NFPA 99-2015
Statement: The revision of this requirements clarifies the allowance of normal circuits to serve Category I spaces as described in 6.3.2.2.1.2. The word "only" in 6.3.2.2.10.1 could be misinterpreted to conflict with 6.3.2.2.1.2.

A new 6.3.2.2.10.2 was added to make it clear that a Category 1 space cannot be served by a Type 2 EES.

Public Input No. 375-NFPA 99-2015 [Section No. 6.3.2.2.11.3]

6.3.2.2.11.3

The sensor for units shall be wired to the unswitched branch circuit(s) serving general lighting within the room.

Statement of Problem and Substantiation for Public Input

The addition of the term “unswitched” removes any confusion a code user may have concerning the applicability of this provision.

Submitter Information Verification

Submitter Full Name: STEPHEN LIPSTER
Organization: THE ELECTRICAL TRADES CENTER
Affilliation: IBEW
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jul 05 12:22:04 EDT 2015

Committee Statement

Resolution: FR-12-NFPA 99-2015
Statement: The addition of the term “unswitched” removes any confusion a code user may have concerning the applicability of this provision.

Public Input No. 371-NFPA 99-2015 [Section No. 6.3.2.3]

6.3.2.3 Laboratories.

Outlets with two to four receptacles, or an equivalent ~~power strip~~ multioutlet assembly , shall be installed every 0.5 m to 1.0 m (1.6 ft to 3.3 ft) in instrument usage areas, and either installation shall be at least 80 mm (3.15 in.) above the countertop.

Statement of Problem and Substantiation for Public Input

The term “power strip” may be mistaken for a temporary, off the shelf, male cord cap multiple outlet assemblies typically used at Code Panel meetings. The term “multioutlet assembly” (commonly known by the trade name Wiremold) is more accurate, and defined in Article 100, and detailed in Article 380 of NFPA 70 National Electrical Code.

Submitter Information Verification

Submitter Full Name: STEPHEN LIPSTER
Organization: THE ELECTRICAL TRADES CENTER
Affilliation: IBEW
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jul 05 12:15:58 EDT 2015

Committee Statement

Resolution: FR-13-NFPA 99-2015
Statement: The term “power strip” may be mistaken for a temporary, off the shelf, male cord cap multiple outlet assemblies. The term “multioutlet assembly” is more accurate, and defined in Article 100, and detailed in Article 380 of NFPA 70 National Electrical Code.

This revision of the title for this section introduces a delineation between standard laboratories and clinical laboratories. The latter is an important function of a health care facility and as such the performance of the electrical systems should be included in this chapter.

Public Input No. 477-NFPA 99-2015 [Section No. 6.3.2.3]

6.3.2.3– Clinical Laboratories.

Outlets with two to four receptacles, or an equivalent power strip, shall be installed every 0.5 m to 1.0 m (1.6 ft to 3.3 ft) in instrument usage areas, and either installation shall be at least 80 mm (3.15 in.) above the countertop.

Statement of Problem and Substantiation for Public Input

This revision introduces a delineation between standard laboratories and clinical laboratories. The latter is an important function of a health care facility and as such the performance of the electrical systems should be included in this chapter.

Submitter Information Verification

Submitter Full Name: JASON DANTONA
Organization: THOMPSON CONSULTANTS INC
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 16:19:48 EDT 2015

Committee Statement

Resolution: FR-13-NFPA 99-2015

Statement: The term “power strip” may be mistaken for a temporary, off the shelf, male cord cap multiple outlet assemblies. The term “multioutlet assembly” is more accurate, and defined in Article 100, and detailed in Article 380 of NFPA 70 National Electrical Code.

This revision of the title for this section introduces a delineation between standard laboratories and clinical laboratories. The latter is an important function of a health care facility and as such the performance of the electrical systems should be included in this chapter.

Public Input No. 522-NFPA 99-2015 [Section No. 6.3.2.5.1]

6.3.2.5.1 Applicability.

The requirements of 6.3.2.5.2 shall apply to ~~hospitals and other buildings~~ healthcare facilities housing Category 1 spaces or utilizing life-support equipment and buildings that provide essential utilities or services for the operation of Category 1 spaces or electrical life-support equipment.

Statement of Problem and Substantiation for Public Input

Revised wording correlates with terminology used throughout the chapter.

Submitter Information Verification

Submitter Full Name: JASON DANTONA
Organization: THOMPSON CONSULTANTS INC
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 17:29:52 EDT 2015

Committee Statement

Resolution: FR-14-NFPA 99-2015
Statement: Revised wording correlates with terminology used throughout the chapter.

Public Input No. 62-NFPA 99-2015 [New Section after 6.3.2.6.1]

TITLE OF NEW CONTENT 6.3.2.6 Surge Protective Devices

Type your content here ...A listed surge protective device (SPD) shall be installed on branch panels that support all critical branch circuits for the protection of critical patient care equipment.

Statement of Problem and Substantiation for Public Input

One potential hazard to damaging electronic equipment in critical patient care areas is damage from power surge. Power surges can be experience from direct or indirect lighting strikes or utility capacitor bank switching. Surge Protection provides enhanced equipment reliability and sustainability for equipment used on a daily basis in critical patient care areas. Extraneous surge events cause damage (immediate or degradation) to sensitive, critical electronic equipment. NFPA 70 has recognized the need for surge protection as evidenced by Article 700.8..

Submitter Information Verification

Submitter Full Name: KENNETH BROWN
Organization: LEVITON MFG. CO., INC.
Affilliation: Leviton
Street Address:
City:
State:
Zip:
Submittal Date: Fri Apr 10 13:26:58 EDT 2015

Committee Statement

Resolution: • 6.3.2.6 of NFPA 99-2015 pertains to Isolated Power Systems, isolation transformers, and line isolation monitors. This 6.3.2.6 portion of NFPA 99 suggested for the “home” for this proposed requirement has NO RELATION WHATSOEVER to either surge protection or to critical branch circuits of Essential Electrical Systems addressed in the Public Input. • The proposed wording indicates “A listed surge protective device (SPD) shall be installed on branch panels that support all critical branch circuits for the protection of critical patient care equipment” without differentiation of the SPD Type Number applicable. As proposed, ANY SPD Type Number would comply with the proposed requirement, but clearly SPD Type 3 (or higher) would NOT be appropriate for that location in the electrical distribution. • SPDs are listed to UL Standard UL 1449. Listed SPDs are NOT listed or evaluated to either UL Standard UL 60601-1, Medical Electrical Equipment, Part 1: General Requirements, or to IEC Standard IEC 60601-1-1, Safety Requirements for Medical Electrical Systems. This fact is EXPLICITLY STATED in the Scope of UL Standard UL 1449. UL Standards that additionally address electrical products for use in healthcare facilities typically have a specific Annex or Supplement to address additional requirements that apply to such products so intended, to address the additional conditions and levels of operation essential to PATIENT SAFETY. Such Annexes and Supplements have requirements referenced to evaluations from either UL Standard UL 60601-1 or IEC Standard IEC 60601-1-1. UL Standard UL 1449 has no such Annex or Supplement. • UL Standard UL 1449 sets maximum leakage current of an SPD Type 3 to 0.5 mA and sets NO maximum leakage current limits whatsoever for SPD Types 1 and 2. By contrast, UL Standard UL 60601-1 and IEC Standard IEC 60601-1-1 limit maximum leakage current to 0.1 mA for medical equipment to ensure safety of medically-weakened patients who are FAR MORE SUSCEPTIBLE TO LEAKAGE CURRENTS due to typically lower body impedance. • In addition to MOVs permitted between Ø and N (i.e., “hot” and neutral), SPDs listed to UL Standard UL 1449 permit MOVs between N and G and between Ø and G. IEC Standard IEC 60601-1-1 and UL Standard UL 60601-1 limits or outright forbids MOVs between N and G and between Ø and G. When MOVs approach end-of-life failure, leakage current increases. Leakage current to ground endangers patient safety. Furthermore, end-of-life failure of MOVs between N and G cannot be detected due to the absence of voltage between N and G under normal conditions and MOVs will not blow open due to the absence of follow-through current. • Essential Electrical Systems in NFPA 99 are comprised of LIFE SAFETY branches and CRITICAL branches. The Substantiation for this Public Input cites “NFPA 70 has recognized the need for surge protection as evidenced by Article 700.8” as the rationale for including listed SPDs in branch panels of all CRITICAL BRANCH circuits of healthcare facilities’ Essential Electrical Systems. NEC® 700.2 defines Emergency Systems (for Article 700) in its closing words “essential for SAFETY of human LIFE”. LIFE SAFETY. NEC® 517.26 and 6.4.2.2.1.4 of NFPA 99 both explicitly recognize requirements of Article 700 (except where modified elsewhere in Article 517) for the LIFE SAFETY branch. Rationalizing that 700.8 for purposes of LIFE SAFETY now additionally applies to the CRITICAL branch is specious.

Public Input No. 365-NFPA 99-2015 [Section No. 6.3.3.1.3.2]

6.3.3.1.3.2

The voltage measurements shall be made with an accuracy of ~~±20~~ ±5 percent.

Statement of Problem and Substantiation for Public Input

Modern measuring instruments are much more accurate than those in the past, this change acknowledges technological progress.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 361-NFPA 99-2015 [Section No. 6.3.3.1.4 [Excluding any Sub-Sections]]	

Submitter Information Verification

Submitter Full Name: STEPHEN LIPSTER
Organization: THE ELECTRICAL TRADES CENTER
Affilliation: IBEW
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jul 05 12:10:38 EDT 2015

Committee Statement

Resolution: FR-15-NFPA 99-2015
Statement: Modern measuring instruments are much more accurate than those in the past, this change acknowledges technological progress.

Public Input No. 361-NFPA 99-2015 [Section No. 6.3.3.1.4 [Excluding any Sub-Sections]]

The impedance measurement shall be made with an accuracy of ~~±20~~ ±5 percent.

Statement of Problem and Substantiation for Public Input

Modern measuring instruments are much more accurate than those in the past, this change acknowledges technological progress.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 365-NFPA 99-2015 [Section No. 6.3.3.1.3.2]	

Submitter Information Verification

Submitter Full Name: STEPHEN LIPSTER
Organization: THE ELECTRICAL TRADES CENTER
Affilliation: IBEW
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jul 05 12:03:56 EDT 2015

Committee Statement

Resolution: FR-16-NFPA 99-2015
Statement: Modern measuring instruments are much more accurate than those in the past, this change acknowledges technological progress.

Public Input No. 510-NFPA 99-2015 [Section No. 6.3.3.1.5.1]

~~6.3.3.1.5.1~~ –

~~Voltage measurements specified in~~ 6.3.3.1.3 ~~shall be made with an instrument having an input resistance of 1000 ohms ±10 percent at frequencies of 1000 Hz or less.~~

Statement of Problem and Substantiation for Public Input

The requirements outlined in this section are specific to the testing equipment not building systems and therefore it is not appropriate in this chapter.

Submitter Information Verification

Submitter Full Name: JASON DANTONA
Organization: THOMPSON CONSULTANTS INC
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 16:59:34 EDT 2015

Committee Statement

Resolution: Specification of a shunt resistance ensures repeatability and reproducibility of measurement results of testing conducted on the building systems.

Public Input No. 221-NFPA 99-2015 [Section No. 6.4.1.1.3]

6.4.1.1.3

Generator load-shed circuits designed for the purpose of load reduction or for load priority systems shall not shed life safety branch loads, critical branch loads serving critical care areas, generator fuel pumps, or other generator accessories. Where possible medical air compressors,

~~medical–surgical~~
medical-surgical vacuum pumps,

~~fire pumps,~~
and the pressure maintenance (jockey) pump(s) for water

-
based fire protection systems

~~, generator fuel pumps, or other generator accessories.~~
shall not be shed, or if programmed to shed shall be connected to the last equipment branch to be shed.

For new facilities anticipated kw loads used for initial load shed programming shall be based upon the Engineer of Record's professional judgement. The anticipated kw loads and load priority schedule shall be updated one year later based on actual recorded loads. .

Statement of Problem and Substantiation for Public Input

Compliance with this is complicated by the NEC definitions of life safety, critical, and equipment branches and what specific equipment is allowed to be connected to them. The NEC 517 specifically states that medical air compressors, medical-surgical vacuum pumps, and jockey pumps be connected to an Equipment Branch ATS. It is not uncommon for a two generator paralleled system to be sized based on NEC demand where one generator supports the life safety, critical, and fire pump loads, and the second generator supports all of the equipment branch loads. Depending on system configuration, i.e. total facility demand load, quantity and size of generators, the implementation of this may be unnecessarily costly, impossible, or mandate a less reliable emergency power system design (i.e. one large generator instead of two smaller generators).
Additionally, in a system with 3 or more generators it is unlikely two generators will fail and have the fire pump running. The reserved capacity for the fire pump typically is enough to allow one additional ATS to be added, which should be the ATS with medical equipment (not HVAC equipment).
Load priority programming is often misunderstood and in a new facility the expected loads are usually based on NEC demand loads that far exceed actual real world loads. By using these loads the system is less likely to add additional ATS's since the system will think the next ATS will add much more load than it really will. The best way to program the load priority is limiting the items not allowed to shed and using accurate, but slightly lower expected kw values than the measured loads. This will ensure a single generator is never overloaded with loads that cannot shed, and also allows the system to support the maximum of ATSs. If loads are slightly higher than expected, the system will respond and shed the next ATS. If capacity becomes available again the system will automatically add the next ATS.

Submitter Information Verification

Submitter Full Name: ERIC SWEET
Organization: MAZZETTI
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 23 12:28:17 EDT 2015

Committee Statement

Resolution: The proposed revisions do not add a clear value to the code and may not be easily enforceable.

Public Input No. 374-NFPA 99-2015 [Section No. 6.4.1.1.3]

6.4.1.1.3

Generator load-shed circuits designed for the purpose of load reduction or for load priority systems shall not shed life safety branch loads, critical branch loads serving ~~critical care areas~~ Categroy 1 space , medical air compressors, medical–surgical vacuum pumps, fire pumps, the pressure maintenance (jockey) pump(s) for water-based fire protection systems, generator fuel pumps, or other generator accessories.

Statement of Problem and Substantiation for Public Input

Definition for Critical Care Area is covered in NFPA 99: 3.3.137 Patient Care Space and is designated as Category 1 Space. Any references in NFPA 99 to “Critical Care Area” should be changed to “Category 1 Space”.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 357-NFPA 99-2015 [Section No. 3.3.28]	

Submitter Information Verification

Submitter Full Name: GARY BECKSTRAND
Organization: UTAH ELECTRICAL JATC
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jul 05 12:19:27 EDT 2015

Committee Statement

Resolution: FR-17-NFPA 99-2015
Statement: Definition for Critical Care Area is covered in NFPA 99: 3.3.137 Patient Care Space and is designated as Category 1 Space. Any references in NFPA 99 to “Critical Care Area” should be changed to “Category 1 Space”.

Public Input No. 503-NFPA 99-2015 [Section No. 6.4.1.1.6.2]

~~6.4.1.1.6.2~~ –

~~Type 3 essential electrical system power sources shall be classified as Type 10, Class X, Level 2 generator sets per NFPA 110, *Standard for Emergency and Standby Power Systems* .~~

Statement of Problem and Substantiation for Public Input

This section includes requirements for type 3 EES Generator sets. Since type 3 has been deleted this is no longer needed.

Submitter Information Verification

Submitter Full Name: JASON DANTONA
Organization: THOMPSON CONSULTANTS INC
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 16:51:23 EDT 2015

Committee Statement

Resolution: FR-18-NFPA 99-2015
Statement: This section includes requirements for type 3 EES Generator sets. Since type 3 has been deleted this is no longer needed.

Public Input No. 513-NFPA 99-2015 [Section No. 6.4.1.1.7]

~~6.4.1.1.7 – Fuel Cell Systems.~~

~~Fuel cell systems shall be permitted to serve as the alternate source for all or part of an essential electrical system, provided the following conditions apply:~~

~~6.4.1.1.7.1 –~~

~~Installation shall comply with NFPA 853, *Standard for Installation of Stationary Fuel Cell Power Systems* .~~

~~6.4.1.1.7.2 –~~

~~N+1 units shall be provided where N units have sufficient capacity to supply the demand load of the portion of the system served.~~

~~6.4.1.1.7.3 * - –~~

~~System shall be able to assume loads within 10 seconds of loss of normal power source.~~

~~6.4.1.1.7.4 –~~

~~System shall have a continuing source of fuel supply, together with sufficient on-site fuel storage for the essential system type.~~

~~6.4.1.1.7.5 –~~

~~A connection shall be provided for a portable diesel generator to supply life safety and critical portions of the distribution system (if present).~~

Statement of Problem and Substantiation for Public Input

Move the requirements outlined in this section to section 6.4.1.3 “Sources”.

Substantiation: The requirements for fuel cells belong under the sources section not under “on-site generator”.

Submitter Information Verification

Submitter Full Name: JASON DANTONA
Organization: THOMPSON CONSULTANTS INC
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 17:06:35 EDT 2015

Committee Statement

Resolution: FR-19-NFPA 99-2015
Statement: This revision moves the requirements outlined in this section to fall under “Sources”. The requirements for fuel cells belong under the sources section not under “on-site generator”.

The final provision has been added because when fuel cell systems are used as an alternate source for an essential electrical systems, they should be held to the same listing standards as other approved equipment and systems.

Public Input No. 360-NFPA 99-2015 [New Section after 6.4.1.1.7.5]

TITLE OF NEW CONTENT

Type your content here ...

6.4.1.1.7.6

System shall be listed for emergency use.

Statement of Problem and Substantiation for Public Input

Fuel Cell Systems, when used as an alternate source for an essential electrical systems, should be held to the same listing standards as other approved equipment and systems.

Submitter Information Verification

Submitter Full Name: STEPHEN LIPSTER
Organization: THE ELECTRICAL TRADES CENTER
Affilliation: IBEW
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jul 05 11:56:00 EDT 2015

Committee Statement

Resolution: FR-19-NFPA 99-2015
Statement: This revision moves the requirements outlined in this section to fall under “Sources”. The requirements for fuel cells belong under the sources section not under “on-site generator”.

The final provision has been added because when fuel cell systems are used as an alternate source for an essential electrical systems, they should be held to the same listing standards as other approved equipment and systems.

Public Input No. 505-NFPA 99-2015 [Section No. 6.4.1.1.18.2]

6.4.1.1.18.2

The following annunciation shall be provided at a minimum:

(1) For Level 1 EPS, local annunciation and facility remote annunciation, or local annunciation and network remote annunciation

(2) ~~For Level 2 EPS, local annunciation~~

(3)

[**110:**5.6.6.2]

Statement of Problem and Substantiation for Public Input

This section still references level 2 EPS which is no longer valid given the deletion of the type 3 EES requirements.

Submitter Information Verification

Submitter Full Name: JASON DANTONA
Organization: THOMPSON CONSULTANTS INC
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 16:54:37 EDT 2015

Committee Statement

Resolution: FR-20-NFPA 99-2015
Statement: This section still references level 2 EPS which is no longer valid given the deletion of the type 3 EES requirements.

Public Input No. 415-NFPA 99-2015 [Section No. 6.4.1.2]

~~6.4.1.2 – Battery.~~

~~Battery systems shall meet all requirements of Article 700 of *NFPA 70* , *National Electrical Code* .~~

Statement of Problem and Substantiation for Public Input

This section conflicts with the requirements of section 6.4.2.2.1.5 which states;
“For the purposes of this code, the provisions for emergency systems in Article 700 of NFPA 70, National Electrical Code, shall be applied only to the life safety branch.”

Submitter Information Verification

Submitter Full Name: CHRIS FINEN
Organization: EATON CORPORATION
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 11:08:53 EDT 2015

Committee Statement

Resolution: FR-21-NFPA 99-2015
Statement: This section conflicted with the requirements of section 6.4.2.2.1.5 which states;

“For the purposes of this code, the provisions for emergency systems in Article 700 of NFPA 70, National Electrical Code, shall be applied only to the life safety branch.”

The appropriate reference standard is NFPA 111, which has been added to this section.

Public Input No. 468-NFPA 99-2015 [Section No. 6.4.2.1.2.1]

6.4.2.1.2.1

Overcurrent protective devices, on the line side of the transfer switch, serving the essential electrical system shall be coordinated for the period of time that a fault's duration extends beyond 0.1 second.

Statement of Problem and Substantiation for Public Input

The allowance for "coordination" for faults beyond 0.1 seconds is valid only so long as at least one source of power, as required by 6.4.1.1.4, is able to supply the essential loads. If a cascading event takes place on the line side of the transfer switch, at least one source of power will still be available to supply the essential load, as required by 6.4.1.1.4.

Submitter Information Verification

Submitter Full Name: GARY BECKSTRAND
Organization: UTAH ELECTRICAL JATC
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 15:53:51 EDT 2015

Committee Statement

Resolution: The committee has reviewed this issue over the past several revisions of NFPA 99. There has been insufficient technical justification submitted that would justify the proposed change.

Public Input No. 469-NFPA 99-2015 [New Section after 6.4.2.1.2.2]

6.4.2.1.2.3 Overcurrent protective devices, on the load side of the transfer switch, serving the essential electrical system shall be selectively coordinated.

6.4.2.1.2.4 Selective Coordination shall not be required as follows:

(1) Between transformer primary and secondary overcurrent protective devices, where only one overcurrent protective device or set of overcurrent protective devices exists on the transformer secondary.

(2) Between overcurrent protective devices of the same size (ampere rating) in series.

Statement of Problem and Substantiation for Public Input

Cascading of overcurrent protective devices on the secondary of the transfer switch will render all sources of power on the line-side of the transfer switch useless. It won't matter whether there are 1 or 10 sources of power as required by 6.4.1.1.4, if the overcurrent protective devices cascade on the secondary of the transfer switch, there will be a dangerous blackout.

Submitter Information Verification

Submitter Full Name: GARY BECKSTRAND
Organization: UTAH ELECTRICAL JATC
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 15:55:43 EDT 2015

Committee Statement

Resolution: The committee has reviewed this issue over the past several revisions of NFPA 99. There has been insufficient technical justification submitted that would justify the proposed change.

Public Input No. 509-NFPA 99-2015 [Section No. 6.4.2.1.5.10]

~~6.4.2.1.5.10 – Engine Generator Exercising Timer.~~

~~A program timing device shall be provided to exercise the EPS as described in Chapter 8 of NFPA 110. [**110:** 6.2.11]~~

~~(A)~~ –

~~Transfer switches shall transfer the connected load to the EPS and immediately return to primary power automatically in case of the EPS failure. [**110:** 6.2.11.1]~~

~~(B)~~ –

~~Exercising timers shall be permitted to be located at the engine control panel in lieu of in the transfer switches. [**110:** 6.2.11.2]~~

~~(C)~~ –

~~A program timing device shall not be required in health care facilities that provide scheduled testing in accordance with NFPA 99, *Health Care Facilities Code* . [**110:** 6.2.11.3]~~

Statement of Problem and Substantiation for Public Input

This section is not required for the following reasons:
1. The requirements outlined in 6.4.2.1.5.10 is in conflict with subparagraph (C).
2. The requirements outlined in item (A) are addressed in 6.4.3.2.7.
3. Deleting this section will still allow health care facilities to omit engine exercising timers on automatic transfer switches

Submitter Information Verification

Submitter Full Name: JASON DANTONA
Organization: THOMPSON CONSULTANTS INC
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 16:57:44 EDT 2015

Committee Statement

Resolution: FR-22-NFPA 99-2015
Statement: This section is not required for the following reasons:

1. The requirements outlined in 6.4.2.1.5.10 is in conflict with subparagraph (C).

2. The requirements outlined in item (A) are addressed in 6.4.3.2.7.

3. Deleting this section will still allow health care facilities to omit engine exercising timers on automatic transfer switches

Public Input No. 355-NFPA 99-2015 [Section No. 6.4.2.2.1.5]

~~6.4.2.2.1.5~~ –

~~For the purposes of this code, the provisions for emergency systems in Article 700 of *NFPA 70, National Electrical Code* , shall be applied only to the life safety branch.~~

Statement of Problem and Substantiation for Public Input

Various recent Standards Council decisions have clearly established that NFPA 99, Health Care Facilities Code, is a performance code. These same Standards Council decisions have clearly established NFPA 70, National Electrical Code, as an installation code. This is consistent with each document's published scope. With this clear delineation established, NFPA 99, a performance code, cannot modify NFPA 70, an installation code. This modification cannot occur because NFPA 99, as a performance code, does not have jurisdiction over installation elements found in NFPA 70, or any other NFPA installation code.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 354-NFPA 99-2015 [Section No. 6.5.2.2.1.5]	
Public Input No. 353-NFPA 99-2015 [Section No. 6.5.2.2.1.4]	
Public Input No. 358-NFPA 99-2015 [Section No. 6.4.2.2.1.6]	

Submitter Information Verification

Submitter Full Name: STEPHEN LIPSTER
Organization: THE ELECTRICAL TRADES CENTER
Affilliation: IBEW
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jul 05 11:36:18 EDT 2015

Committee Statement

Resolution: It is the intention that Article 700 of the NEC apply the life safety branch of the EES. The removal of these sections leaves ambiguous understanding of what the application would be. Maintaining the current language is the best way to identify how the TC envision Article 700 applying to NFPA 99 systems.

Public Input No. 417-NFPA 99-2015 [Section No. 6.4.2.2.1.5]

~~6.4.2.2.1.5~~ –

~~For the purposes of this code, the provisions for emergency systems in Article 700 of *NFPA 70, National Electrical Code* , shall be applied only to the life safety branch.~~

Statement of Problem and Substantiation for Public Input

The performance requirements for the life safety branch of healthcare facilities is often unique and may vary from the Emergency System requirements (NFPA 70 - Art 700) for other occupancies. Linking the life safety branch directly to Article 700 inadvertently invokes unnecessary performance requirements intended for other occupancy classes. This in turn causes enforcement dilemmas and miscorrelation between documents. All performance requirements for the life safety branch need to be part of the NFPA 99 requirements.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 418-NFPA 99-2015 [Section No. 6.4.2.2.1.6]	

Submitter Information Verification

Submitter Full Name: CHRIS FINEN
Organization: EATON CORPORATION
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 11:21:18 EDT 2015

Committee Statement

Resolution: It is the intention that Article 700 of the NEC apply the life safety branch of the EES. The removal of these sections leaves ambiguous understanding of what the application would be. Maintaining the current language is the best way to identify how the TC envision Article 700 applying to NFPA 99 systems.

Public Input No. 358-NFPA 99-2015 [Section No. 6.4.2.2.1.6]

~~6.4.2.2.1.6 –~~

~~The following portions of Article 700 of *NFPA 70* shall be amended as follows:~~

~~(A) –~~

~~700.4 shall not apply.~~

~~(B) –~~

~~700.10 (D) (1) through (3) shall not apply.~~

~~(C) –~~

~~700.17 Branch Circuits for Emergency Lighting. Branch circuits that supply emergency lighting shall be installed to provide service from a source complying with 700.12 when the normal supply for lighting is interrupted or where single circuits supply luminaires containing secondary batteries.~~

~~(D) –~~

~~700.28 shall not apply.~~

Statement of Problem and Substantiation for Public Input

Various recent Standards Council decisions have clearly established that NFPA 99, Health Care Facilities Code, is a performance code. These same Standards Council decisions have clearly established NFPA 70, National Electrical Code, as an installation code. This is consistent with each document's published scope. With this clear delineation established, NFPA 99, a performance code, cannot modify NFPA 70, an installation code. This modification cannot occur because NFPA 99, as a performance code, does not have jurisdiction over installation elements found in NFPA 70, or any other NFPA installation code.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 353-NFPA 99-2015 [Section No. 6.5.2.2.1.4]	
Public Input No. 354-NFPA 99-2015 [Section No. 6.5.2.2.1.5]	
Public Input No. 355-NFPA 99-2015 [Section No. 6.4.2.2.1.5]	

Submitter Information Verification

Submitter Full Name: STEPHEN LIPSTER
Organization: THE ELECTRICAL TRADES CENTER
Affilliation: IBEW
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jul 05 11:46:30 EDT 2015

Committee Statement

Resolution: It is the intention that Article 700 of the NEC apply the life safety branch of the EES. The removal of these sections leaves ambiguous understanding of what the application would be. Maintaining the current language is the best way to identify how the TC envision Article 700 applying to NFPA 99 systems.

Public Input No. 418-NFPA 99-2015 [Section No. 6.4.2.2.1.6]

~~6.4.2.2.1.6 –~~

~~The following portions of Article 700 of *NFPA 70* shall be amended as follows:~~

~~(A) –~~

~~700.4 shall not apply.~~

~~(B) –~~

~~700.10 (D) (1) through (3) shall not apply.~~

~~(C) –~~

~~700.17 Branch Circuits for Emergency Lighting. Branch circuits that supply emergency lighting shall be installed to provide service from a source complying with 700.12 when the normal supply for lighting is interrupted or where single circuits supply luminaires containing secondary batteries.~~

~~(D) –~~

~~700.28 shall not apply.~~

Statement of Problem and Substantiation for Public Input

The performance requirements for the life safety branch of healthcare facilities is often unique and may vary from the Emergency System requirements (NFPA 70 - Art 700) for other occupancies. Linking the life safety branch directly to Article 700 inadvertently invokes unnecessary performance requirements intended for other occupancy classes. This in turn causes enforcement dilemmas and miscorrelation between documents. All performance requirements for the life safety branch need to be part of the NFPA 99 requirements.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 417-NFPA 99-2015 [Section No. 6.4.2.2.1.5]	

Submitter Information Verification

Submitter Full Name: CHRIS FINEN
Organization: EATON CORPORATION
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 11:37:09 EDT 2015

Committee Statement

Resolution: It is the intention that Article 700 of the NEC apply the life safety branch of the EES. The removal of these sections leaves ambiguous understanding of what the application would be. Maintaining the current language is the best way to identify how the TC envision Article 700 applying to NFPA 99 systems.

Public Input No. 502-NFPA 99-2015 [Section No. 6.4.2.2.3.2]

6.4.2.2.3.2

The life safety branch shall supply power as follows:

(1) Illumination of means of egress in accordance with NFPA *101*, *Life Safety Code*

(2) Exit signs and exit directional signs in accordance with NFPA *101*, *Life Safety Code*

(3)* ~~Hospital communications~~ Communications systems, where used for issuing instruction during emergency conditions

(4) Generator set location as follows:

(5) Task illumination

(6) Battery charger for emergency battery-powered lighting unit(s)

(7) Select receptacles at the generator set location and essential electrical system transfer switch locations

(8) Elevator cab lighting, control, communications, and signal systems

(9) Electrically powered doors used for building egress

(10) Fire alarms and auxiliary functions of fire alarm combination systems complying with *NFPA 72*, *National Fire Alarm and Signaling Code*

Statement of Problem and Substantiation for Public Input

Deleting the word hospital makes the wording consistent with type 2 EES 6.5.2.2.2.1 (4).

Submitter Information Verification

Submitter Full Name: JASON DANTONA
Organization: THOMPSON CONSULTANTS INC
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 16:48:40 EDT 2015

Committee Statement

Resolution: FR-23-NFPA 99-2015
Statement: Deleting the word hospital makes the wording consistent with type 2 EES 6.5.2.2.2.1 (4).

Public Input No. 285-NFPA 99-2015 [Section No. 6.4.2.2.4.2]

6.4.2.2.4.2

The critical branch shall supply power for task illumination, fixed equipment, select receptacles, and select power circuits serving the following spaces and functions related to patient care:

(1) Critical care spaces that utilize anesthetizing gases, task illumination, select receptacles, and fixed equipment

(2) Isolated power systems in special environments

(3) Task illumination and select receptacles in the following:

(4) _ Patient care spaces, including infant nurseries, selected acute nursing areas, psychiatric bed areas (omit receptacles), and ward treatment rooms

(5) _ Medication preparation spaces

(6) _ Pharmacy dispensing spaces

(7) _ Nurses' stations (unless adequately lighted by corridor luminaires)

(8) Additional specialized patient care task illumination and receptacles, where needed

(9) Nurse call systems

(10) Blood, bone, and tissue banks

(11)* Telephone equipment rooms and closets

(12) Task illumination, select receptacles, and select power circuits for the following areas:

(13) _ General care beds with at least one duplex receptacle per patient bedroom, and task illumination as required by the governing body of the health care facility

(14) _ Angiographic labs

(15) _ Cardiac catheterization labs

(16) _ Coronary care units

(17) _ Hemodialysis rooms or areas

(18) _ Emergency room treatment areas (select)

(19) _ Human physiology labs

(20) _ Intensive care units

(21) _ Postoperative recovery rooms (select)

(22) Additional task illumination, receptacles, and select power circuits needed for effective facility operation, including single-phase fractional horsepower motors, which are permitted to be connected to the critical branch

(23) _ * Clinical IT-network equipment

(24) _ * Wireless phone and paging equipment for clinical staff communications

A.6.4.2.2.4.2(10) The servers, routers and IT networking equipment comprising the clinical IT-network need to be powered by the critical branch.l To ensure patient and staff safety, safe system operation, overall systems effectiveness, and data and systemss security of personal information and clinical use data, the clinical IT-network needs to be managed in accordance with ANSI-AAMI-IEC 80001-1 *Application of risk management for IT-networks incorporating medical devices -- Part 1: Roles, responsibilities and activities* . (See 7.3.3.7)

When the clinical IT-network employs wireless networking equipment, the ANSI-AAMI-IEC TIR 80001-2-3 *Application of risk managment for IT-networks incorporating medical devices -- Part 2-3: Guidance for wireless networks* , needs to be applied and followed.

A6.4.2.2.4.2(11) Wireless phone and paging equipment which are intergrated with the nurse call system or with a shared interoperable clinical IT-network, for the purposes of performing enhanced clinical staff communications or performing distgributed alarm system communications in accordance with ANSI-AAMI-IEC TIR 80001-2-5 *Application of risk management for IT-networks incorporating medical devices -- Part 2-5: Guidance on distributed alarm systems* , need to be powered by the critical branch. (See 7.3.3.5)

Statement of Problem and Substantiation for Public Input

There is a need for the NFPA 99 code to establish and define the infrastructure requirements for a clinical IT-network, which is dedicated for use by clinicians and patients. Such a network comprises the servers, switches, routers (etc.) and voice and data communications equipment which are used to transport clinical data and information over a shared IT network infrastructure. Defining the requirements for a

Clinical IT network in the NFPA 99 Code will ensure patient and staff safety, safe system operation, overall system effectiveness, and data and system security of personal information and clinical use data which can be transported on the clinical IT network.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 284-NFPA 99-2015 [New Section after 3.3.22]	Defintition: Clinical IT-Network
Public Input No. 288-NFPA 99-2015 [Section No. 7.3.3.5]	
Public Input No. 291-NFPA 99-2015 [Section No. 7.3.3.7]	
Public Input No. 292-NFPA 99-2015 [Section No. 7.4.3.5]	
Public Input No. 293-NFPA 99-2015 [Section No. 7.4.3.7]	

Submitter Information Verification

Submitter Full Name: VINCE BACLAWSKI
Organization: NEMA
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 30 11:03:36 EDT 2015

Committee Statement

Resolution: FR-33-NFPA 99-2015

Statement: Item (1) was revised to used consistent terminology, acknowleding that the term "critical care areas" has been replaced with "Category 1 spaces." Specific levels of sedation have also been added to this item to be consistent with the use in the rest of the code.

Item (2) was deleted because it is not necessary to place all isolated power systems on the critical care branch in all instances. Other sections may require some of the components served by an IPS to be on the critical branch which will then drive the inclusion of it.

Item (7) was revised to match the terminology in Chapter 7 and therefore include much more than what it was limited to in just referring to telephone equipment rooms and closets.

Item (8)(a) was revised to use consistent terminology with the rest of the chapter/code.

Items (9) and (10) were added based on the additions of these important IT and Communication equipment to Chapter 7.

Public Input No. 363-NFPA 99-2015 [Section No. 6.4.2.2.4.2]

6.4.2.2.4.2

The critical branch shall supply power for task illumination, fixed equipment, select receptacles, and select power circuits serving the following spaces and functions related to patient care:

(1) ~~Critical care~~ Category 1 spaces that utilize anesthetizing gases, task illumination, select receptacles, and fixed equipment

(2) Isolated power systems in special environments

(3) Task illumination and select receptacles in the following:

(4) Patient care spaces, including infant nurseries, selected acute nursing areas, psychiatric bed areas (omit receptacles), and ward treatment rooms

(5) Medication preparation spaces

(6) Pharmacy dispensing spaces

(7) Nurses' stations (unless adequately lighted by corridor luminaires)

(8) Additional specialized patient care task illumination and receptacles, where needed

(9) Nurse call systems

(10) Blood, bone, and tissue banks

(11)* Telephone equipment rooms and closets

(12) Task illumination, select receptacles, and select power circuits for the following areas:

(13) General care beds with at least one duplex receptacle per patient bedroom, and task illumination as required by the governing body of the health care facility

(14) Angiographic labs

(15) Cardiac catheterization labs

(16) Coronary care units

(17) Hemodialysis rooms or areas

(18) Emergency room treatment areas (select)

(19) Human physiology labs

(20) Intensive care units

(21) Postoperative recovery rooms (select)

(22) Additional task illumination, receptacles, and select power circuits needed for effective facility operation, including single-phase fractional horsepower motors, which are permitted to be connected to the critical branch

Statement of Problem and Substantiation for Public Input

Definition for Critical Care Area is covered in NFPA 99: 3.3.137 Patient Care Space and is designated as Category 1 Space. Any references in NFPA 99 to "Critical Care Area" should be changed to "Category 1 Space".

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 357-NFPA 99-2015 [Section No. 3.3.28]	

Submitter Information Verification

Submitter Full Name: GARY BECKSTRAND
Organization: UTAH ELECTRICAL JATC
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jul 05 12:04:06 EDT 2015

Committee Statement

Resolution: FR-33-NFPA 99-2015

Statement: Item (1) was revised to used consistent terminology, acknowleding that the term "critical care areas" has been replaced with "Category 1 spaces." Specific levels of sedation have also been added to this item to be consistent with the use in the rest of the code.

Item (2) was deleted because it is not necessary to place all isolated power systems on the critical care branch in all instances. Other sections may require some of the components served by an IPS to be on the critical branch which will then drive the inclusion of it.

Item (7) was revised to match the terminology in Chapter 7 and therefore include much more than what it was limited to in just referring to telephone equipment rooms and closets.

Item (8)(a) was revised to use consistent terminology with the rest of the chapter/code.

Items (9) and (10) were added based on the additions of these important IT and Communication equipment to Chapter 7.

Public Input No. 483-NFPA 99-2015 [Section No. 6.4.2.2.4.2]

6.4.2.2.4.2

The critical branch shall supply power for task illumination, fixed equipment, select receptacles, and select power circuits serving the following spaces and functions related to patient care:

(1) Critical care spaces that utilize anesthetizing gases, task illumination, select receptacles, and fixed equipment

(2) Isolated power systems in special environments

(3) Task illumination and select receptacles in the following:

(4) _ Patient care spaces, including infant nurseries, selected acute nursing areas, psychiatric bed areas (omit receptacles), and ward treatment rooms

(5) _ Medication preparation spaces

(6) _ Pharmacy dispensing spaces

(7) _ Nurses' stations (unless adequately lighted by corridor luminaires)

(8) Additional specialized patient care task illumination and receptacles, where needed

(9) Nurse call systems

(10) Blood, bone, and tissue banks

(11)* Telephone equipment rooms and closets

(12) Task illumination, select receptacles, and select power circuits for the following areas:

~~General care beds~~

(a) Category 1 or 2 spaces with at least one duplex receptacle per patient

~~bedroom~~

(a) bed location , and task illumination as required by the governing body of the health care facility

(b) _ Angiographic labs

(c) _ Cardiac catheterization labs

(d) _ Coronary care units

(e) _ Hemodialysis rooms or areas

(f) _ Emergency room treatment areas (select)

(g) _ Human physiology labs

(h) _ Intensive care units

(i) _ Postoperative recovery rooms (select)

(13) Additional task illumination, receptacles, and select power circuits needed for effective facility operation, including single-phase fractional horsepower motors, which are permitted to be connected to the critical branch

Statement of Problem and Substantiation for Public Input

The term "room" was removed from the document and replaced with "space" as part of the 2015 edition. This change is intended to correlate with the changes to risk categories. The term "patient bedroom was changed" to "patient bed location" to correlate with 6.3.2.2.1.1.

Submitter Information Verification

Submitter Full Name: JASON DANTONA
Organization: THOMPSON CONSULTANTS INC
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 16:26:55 EDT 2015

Committee Statement

Resolution: FR-33-NFPA 99-2015

Statement: Item (1) was revised to used consistent terminology, acknowleding that the term "critical care areas" has been replaced with "Category 1 spaces." Specific levels of sedation have also been added to this item to be consistent with the use in the rest of the code.

Item (2) was deleted because it is not necessary to place all isolated power systems on the critical care branch in all instances. Other sections may require some of the components served by an IPS to be on the critical branch which will then drive the inclusion of it.

Item (7) was revised to match the terminology in Chapter 7 and therefore include much more than what it was limited to in just referring to telephone equipment rooms and closets.

Item (8)(a) was revised to use consistent terminology with the rest of the chapter/code.

Items (9) and (10) were added based on the additions of these important IT and Communication equipment to Chapter 7.

Public Input No. 485-NFPA 99-2015 [Section No. 6.4.2.2.4.2]

6.4.2.2.4.2

The critical branch shall supply power for task illumination, fixed equipment, select receptacles, and select power circuits serving the following spaces and functions related to patient care:

(1) Critical care spaces ~~that utilize anesthetizing gases~~ where deep sedation or generawhere deep sedation or general anesthesia is administeredl anestesia is administred , task illumination, select receptacles, and fixed equipment

(2) Isolated power systems in special environments

(3) Task illumination and select receptacles in the following:

(4) _ Patient care spaces, including infant nurseries, selected acute nursing areas, psychiatric bed areas (omit receptacles), and ward treatment rooms

(5) _ Medication preparation spaces

(6) _ Pharmacy dispensing spaces

(7) _ Nurses' stations (unless adequately lighted by corridor luminaires)

(8) Additional specialized patient care task illumination and receptacles, where needed

(9) Nurse call systems

(10) Blood, bone, and tissue banks

(11)* Telephone equipment rooms and closets

(12) Task illumination, select receptacles, and select power circuits for the following areas:

(13) _ General care beds with at least one duplex receptacle per patient bedroom, and task illumination as required by the governing body of the health care facility

(14) _ Angiographic labs

(15) _ Cardiac catheterization labs

(16) _ Coronary care units

(17) _ Hemodialysis rooms or areas

(18) _ Emergency room treatment areas (select)

(19) _ Human physiology labs

(20) _ Intensive care units

(21) _ Postoperative recovery rooms (select)

(22) Additional task illumination, receptacles, and select power circuits needed for effective facility operation, including single-phase fractional horsepower motors, which are permitted to be connected to the critical branch

Statement of Problem and Substantiation for Public Input

Replaced the term "anesthetizing gases" with "deep sedation or general anesthesia" to provide similar terminology already used in sections 6.3.2.2.11.1, 6.3.4.1.3 and 6.3.4.1.1.

Submitter Information Verification

Submitter Full Name: JASON DANTONA
Organization: THOMPSON CONSULTANTS INC
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 16:29:35 EDT 2015

Committee Statement

Resolution: FR-33-NFPA 99-2015

Statement: Item (1) was revised to used consistent terminology, acknowleding that the term "critical care areas" has been replaced with "Category 1 spaces." Specific levels of sedation have also been added to this item to be consistent with the use in the rest of the code.

Item (2) was deleted because it is not necessary to place all isolated power systems on the critical care branch in all instances. Other sections may require some of the components served by an IPS to be on the critical branch which will then drive the inclusion of it.

Item (7) was revised to match the terminology in Chapter 7 and therefore include much more than what it was limited to in just referring to telephone equipment rooms and closets.

Item (8)(a) was revised to use consistent terminology with the rest of the chapter/code.

Items (9) and (10) were added based on the additions of these important IT and Communication equipment to Chapter 7.

Public Input No. 495-NFPA 99-2015 [Section No. 6.4.2.2.4.2]

6.4.2.2.4.2

The critical branch shall supply power for task illumination, fixed equipment, select receptacles, and select power circuits serving the following spaces and functions related to patient care:

(1) Critical care spaces that utilize anesthetizing gases, task illumination, select receptacles, and fixed equipment

(2) Isolated power systems in ~~special environments~~ wet procedure locations

(3) Task illumination and select receptacles in the following:

(4) _ Patient care spaces, including infant nurseries, selected acute nursing areas, psychiatric bed areas (omit receptacles), and ward treatment rooms

(5) _ Medication preparation spaces

(6) _ Pharmacy dispensing spaces

(7) _ Nurses' stations (unless adequately lighted by corridor luminaires)

(8) Additional specialized patient care task illumination and receptacles, where needed

(9) Nurse call systems

(10) Blood, bone, and tissue banks

(11)* Telephone equipment rooms and closets

(12) Task illumination, select receptacles, and select power circuits for the following areas:

(13) _ General care beds with at least one duplex receptacle per patient bedroom, and task illumination as required by the governing body of the health care facility

(14) _ Angiographic labs

(15) _ Cardiac catheterization labs

(16) _ Coronary care units

(17) _ Hemodialysis rooms or areas

(18) _ Emergency room treatment areas (select)

(19) _ Human physiology labs

(20) _ Intensive care units

(21) _ Postoperative recovery rooms (select)

(22) Additional task illumination, receptacles, and select power circuits needed for effective facility operation, including single-phase fractional horsepower motors, which are permitted to be connected to the critical branch

Statement of Problem and Substantiation for Public Input

The term "special environments" is not defined. Replacing this term with "wet procedure locations" correlates with 6.3.2.2.8

Submitter Information Verification

Submitter Full Name: JASON DANTONA
Organization: THOMPSON CONSULTANTS INC
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 16:38:38 EDT 2015

Committee Statement

Resolution: FR-33-NFPA 99-2015

Statement: Item (1) was revised to used consistent terminology, acknowleding that the term "critical care areas" has been replaced with "Category 1 spaces." Specific levels of sedation have also been added to this item to be consistent with the use in the rest of the code.

Item (2) was deleted because it is not necessary to place all isolated power systems on the critical care branch in all instances. Other sections may require some of the components served by an IPS to be on the critical branch which will then drive the inclusion of it.

Item (7) was revised to match the terminology in Chapter 7 and therefore include much more than what it was limited to in just referring to telephone equipment rooms and closets.

Item (8)(a) was revised to use consistent terminology with the rest of the chapter/code.

Items (9) and (10) were added based on the additions of these important IT and Communication equipment to Chapter 7.

Public Input No. 492-NFPA 99-2015 [Section No. 6.4.2.2.6.2(A)]

~~(A)~~ –

~~The number of receptacles on a single branch circuit for areas described in~~ ~~6.4.2.2.4.2(8)~~ ~~shall be minimized to limit the effects of a branch-circuit outage.~~

Statement of Problem and Substantiation for Public Input

The requirement to “minimize” the number of receptacles is not quantified and therefore is unenforceable language.

Submitter Information Verification

Submitter Full Name: JASON DANTONA
Organization: THOMPSON CONSULTANTS INC
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 16:36:52 EDT 2015

Committee Statement

Resolution: FR-24-NFPA 99-2015
Statement: The requirement to “minimize” the number of receptacles is not quantified and therefore is unenforceable language.

Public Input No. 72-NFPA 99-2015 [Section No. 6.4.2.2.6.4]

6.4.2.2.6.4 Mechanical Protection of the Life Safety and Critical Branches.

The wiring of the life safety and critical branches shall be mechanically protected by ~~*raceways*~~ ~~,~~ a *raceway system, or a cable having a metallic armor or sheathing assembly* , as defined in *NFPA 70*, *National Electrical Code*.

Statement of Problem and Substantiation for Public Input

UL 1569 states :25.6 The length of cable being tested is to be advanced to and crushed at each of the successive marks for a total of ten crushes. Round cable is not acceptable if the average of the ten crushing trials is less than 1000 lbf or 4448 N or 454 kgf for a test sample containing 14 AWG conductors. Round cable is not acceptable if the average of the ten crushing trials is less than 2000 lbf or 8896 N or 907 kgf for a test sample containing 2 AWG conductors. Clearly Type MC Cable designed in accordance with UL 1569 and constructed to meet the rigorous requirements of NFPA 70 - 517.13(A), that are also to be protected within suspended ceilings and wall cavities. The extensive crush and impact studies done to meet the minimum UL 1569 standard proves that Type MC Cable is robust enough to be placed in walls and ceilings without any risk of mechanical damage.

By expanding the language to metallic armor or sheathing the use of a proven listed and labeled product, as a permitted Chapter 3 Wiring Method in the National Electrical Code. While Section 517.30(C)(3)(3) already permits these flexible metallic sheathed cables to be used in specific conditions, it is our belief that normal Health Care Facility Type Cable would perform no differently during the construction process where it will be inspected and enclosed behind barriers to prevent mechanical damage. While Section 517.30(C)(3) does not specifically permit the use of Type MC-HCF Cables, during the 2017 NEC Code Making Panel process it was specified that NFPA 99 has to lead the charge and the NEC will follow. Doing so will permit this proven and durable wiring method to be used in Critical and Life Safety Branches.

Also due to no definition of the term "mechanical protection" the metallic armor or sheathing would provide adequate protection due to the crush tests required by UL 1569. Article 320 and 330 of the National Electrical Code only prohibit Type MC or AC Cable in locations subject to physical damage. The vast majority of these critical and life safety branch circuits are above ceilings and in walls which removes the physical damage component and clearly the metallic armor or sheathing exceeds any level of mechanical protection needed in these controlled environments.

Submitter Information Verification

Submitter Full Name: PAUL ABERNATHY
Organization:
Street Address:
City:
State:
Zip:
Submittal Date: Fri Apr 24 17:10:51 EDT 2015

Committee Statement

Resolution: In accordance with 1.1.4.2(1), requirements for wiring and installation of equipment are covered in NFPA 70, National Electrical Code. Public Comment No. 15-55a (Log #1610) of the A2013 Second Draft Report (ROC) for NFPA 70 had been put on Hold for the A2016 Cycle for NFPA 70 while it was being considered by an NEC Correlating Committee Task Group. Action of Public Input No. 341 of the A2016 First Draft Report for NFPA 70 did not reach completion on Code-Making Panel 15 as the issue first requires action by Code-Making Panel 7 to specify requirements and identification. Consequently, it is premature to revise 6.4.2.2.6.4 of NFPA 99 until requirements, identification and installation are first specified in NFPA 70 for such metal-sheathed cable intended for health care facilities.

Public Input No. 489-NFPA 99-2015 [Section No. 6.4.3.2.7]

~~6.4.3.2.7~~ –

~~If the emergency power source fails during a test, provisions shall be made to immediately retransfer to the normal source.~~

Statement of Problem and Substantiation for Public Input

Move 6.4.3.2.7 to new section 6.4.2.1.5.15 Retransfer.
"If the emergency power source fails during a test, provisions shall be made to immediately retransfer to the normal source."
Renumber existing 6.4.2.1.5.15 to 6.4.2.1.5.16 and subsequent sections

substantiation:
This requirement describes a performance feature required for automatic transfer switches and as such is more appropriate to be included under 6.4.2.1.4 “Automatic Transfer Switch Features” rather than under

Submitter Information Verification

Submitter Full Name: JASON DANTONA
Organization: THOMPSON CONSULTANTS INC
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 16:32:45 EDT 2015

Committee Statement

Resolution: FR-25-NFPA 99-2015
Statement: This requirement describes a performance feature required for automatic transfer switches and as such is more appropriate to be included under 6.4.2.1.5 “Automatic Transfer Switch Features” rather than under

Public Input No. 461-NFPA 99-2015 [Section No. 6.4.4.1.1]

6.4.4.1.1 Maintenance and Testing of Alternate Power Source ~~and~~ , Transfer Switches, and other equipment .

6.4.4.1.1.1 Maintenance of Alternate Power Source.

The generator set or other alternate power source and associated equipment, including all appurtenance parts, shall be so maintained as to be capable of supplying service within the shortest time practicable and within the 10-second interval specified in 6.4.1.1.11 and 6.4.3.1.

6.4.4.1.1.2

The 10-second criterion shall not apply during the monthly testing of an essential electrical system. If the 10-second criterion is not met during the monthly test, a process shall be provided to annually confirm the capability of the life safety and critical branches to comply with 6.4.3.1.

6.4.4.1.1.3

Maintenance shall be performed in accordance with NFPA 110, *Standard for Emergency and Standby Power Systems*, Chapter 8. Maintenance of the electrical equipment for the life safety branch, critical branch, and equipment branch shall be maintained in accordance with the manufacturer instructions and industry standards.

6.4.4.1.1.4 Inspection and Testing.

Criteria, conditions, and personnel requirements shall be in accordance with 6.4.4.1.1.4(A) through 6.4.4.1.1.4(C).

(A)*

Test Criteria. Generator sets shall be tested 12 times a year, with testing intervals of not less than 20 days nor more than 40 days. Generator sets serving essential electrical systems shall be tested in accordance with NFPA 110, *Standard for Emergency and Standby Power Systems*, Chapter 8.

(B)

Test Conditions. The scheduled test under load conditions shall include a complete simulated cold start and appropriate automatic and manual transfer of all essential electrical system loads.

(C)

Test Personnel. The scheduled tests shall be conducted by competent personnel to keep the machines ready to function and, in addition, serve to detect causes of malfunction and to train personnel in operating procedures.

Statement of Problem and Substantiation for Public Input

NFPA 110 Scope 1.1.1 only covers from the Level 1 and Level 2 power sources to the loadside terminals of the transfer equipment. Proper maintenance of the electrical equipment on the loadside of the transfer equipment is equally important.

Submitter Information Verification

Submitter Full Name: GARY BECKSTRAND
Organization: UTAH ELECTRICAL JATC
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 15:36:03 EDT 2015

Committee Statement

Resolution: FR-26-NFPA 99-2015
Statement: NFPA 110 Scope 1.1.1 only covers from the Level 1 and Level 2 power sources to the loadside terminals of the transfer equipment. Proper maintenance of the electrical equipment on the loadside of the transfer equipment is equally important.

Public Input No. 466-NFPA 99-2015 [Section No. 6.4.4.1.2.1]

6.4.4.1.2.1* Circuit Breakers.

Main and feeder circuit breakers shall be inspected annually, and ~~a~~ maintained in accordance with manufacturer's instructions and industry standards . A program for periodically exercising the components shall be established according to manufacturer's ~~recommendations~~ instructions .

Statement of Problem and Substantiation for Public Input

Maintenance should be required according to the manufacturer's instructions or industry standards.

Submitter Information Verification

Submitter Full Name: GARY BECKSTRAND
Organization: UTAH ELECTRICAL JATC
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 15:45:17 EDT 2015

Committee Statement

Resolution: FR-27-NFPA 99-2015
Statement: Maintenance should be required according to the manufacturer's instructions or industry standards.

Public Input No. 470-NFPA 99-2015 [Section No. 6.5.2.1.1.1]

6.5.2.1.1.1

Overcurrent protective devices, on the line side of the transfer switch, serving the essential electrical system shall be coordinated for the period of time that a fault's duration extends beyond 0.1 second.

Statement of Problem and Substantiation for Public Input

The allowance for "coordination" for faults beyond 0.1 seconds is valid only so long as at least one source of power, as required by 6.4.1.1.4, is able to supply the essential loads. If a cascading event takes place on the line side of the transfer switch, at least one source of power will still be available to supply the essential load, as required by 6.4.1.1.4.

Submitter Information Verification

Submitter Full Name: GARY BECKSTRAND
Organization: UTAH ELECTRICAL JATC
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 15:58:41 EDT 2015

Committee Statement

Resolution: The committee has reviewed this issue over the past several revisions of NFPA 99. There has been insufficient technical justification submitted that would justify the proposed change.

Public Input No. 471-NFPA 99-2015 [New Section after 6.5.2.1.1.2]

6.5.2.1.1.3 Overcurrent protective devices, on the load side of the transfer switch, serving the essential electrical system shall be selectively coordinated.

6.5.2.1.1.4 Selective Coordination shall not be required as follows:

(1) Between transformer primary and secondary overcurrent protective devices, where only one overcurrent protective device or set of overcurrent protective devices exists on the transformer secondary.

(2) Between overcurrent protective devices of the same size (ampere rating) in series.

Statement of Problem and Substantiation for Public Input

Cascading of overcurrent protective devices on the secondary of the transfer switch will render all sources of power on the line-side of the transfer switch useless. It won't matter whether there are 1 or 10 sources of power as required by 6.4.1.1.4, if the overcurrent protective devices cascade on the secondary of the transfer switch, there will be a dangerous blackout.

Submitter Information Verification

Submitter Full Name: GARY BECKSTRAND
Organization: UTAH ELECTRICAL JATC
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 16:02:52 EDT 2015

Committee Statement

Resolution: The committee has reviewed this issue over the past several revisions of NFPA 99. There has been insufficient technical justification submitted that would justify the proposed change.

Public Input No. 524-NFPA 99-2015 [Section No. 6.5.2.2.1.3]

~~6.5.2.2.1.3~~ –

~~Each branch of the essential electrical system shall have one or more transfer switches.~~

Statement of Problem and Substantiation for Public Input

Change to delete and re-insert this requirement before 6.5.2.2.1.6

substantiation:
These two sections need to be consecutive as the contain requirements relating to the number and topology of automatic transfer switches.

Submitter Information Verification

Submitter Full Name: JASON DANTONA
Organization: THOMPSON CONSULTANTS INC
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 17:39:16 EDT 2015

Committee Statement

Resolution: FR-28-NFPA 99-2015
Statement: This revision places this requirement before 6.5.2.2.1.6. These two sections need to be consecutive as the contain requirements relating to the number and topology of automatic transfer switches.

Public Input No. 353-NFPA 99-2015 [Section No. 6.5.2.2.1.4]

~~6.5.2.2.1.4~~ –

~~For the purposes of this code, Article 700 shall only be applied to the life safety branch.~~

Statement of Problem and Substantiation for Public Input

Various recent Standards Council decisions have clearly established that NFPA 99, Health Care Facilities Code, is a performance code. These same Standards Council decisions have clearly established NFPA 70, National Electrical Code, as an installation code. This is consistent with each document's published scope. With this clear delineation established, NFPA 99, a performance code, cannot modify NFPA 70, an installation code. This modification cannot occur because NFPA 99, as a performance code, does not have jurisdiction over installation elements found in NFPA 70, or any other NFPA installation code.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 354-NFPA 99-2015 [Section No. 6.5.2.2.1.5]	
Public Input No. 355-NFPA 99-2015 [Section No. 6.4.2.2.1.5]	
Public Input No. 358-NFPA 99-2015 [Section No. 6.4.2.2.1.6]	

Submitter Information Verification

Submitter Full Name: STEPHEN LIPSTER
Organization: THE ELECTRICAL TRADES CENTER
Affilliation: IBEW
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jul 05 11:30:13 EDT 2015

Committee Statement

Resolution: It is the intention that Article 700 of the NEC apply the life safety branch of the EES. The removal of these sections leaves ambiguous understanding of what the application would be. Maintaining the current language is the best way to identify how the TC envision Article 700 applying to NFPA 99 systems.

Public Input No. 354-NFPA 99-2015 [Section No. 6.5.2.2.1.5]

~~6.5.2.2.1.5~~ –

~~The following portions of Article 700 of NFPA 70 shall be amended as follows:~~

~~(A)~~ –

~~700.4 shall not apply.~~

~~(B)~~ –

~~700.10 (D) (1) through (3) shall not apply.~~

~~(C)~~ –

~~700.17 Branch Circuits for Emergency Lighting. Branch circuits that supply emergency lighting shall be installed to provide service from a source complying with 700.12 when the normal supply for lighting is interrupted or where single circuits supply luminaires containing secondary batteries.~~

~~(D)~~ –

~~700.28 shall not apply.~~

Statement of Problem and Substantiation for Public Input

Various recent Standards Council decisions have clearly established that NFPA 99, Health Care Facilities Code, is a performance code. These same Standards Council decisions have clearly established NFPA 70, National Electrical Code, as an installation code. This is consistent with each document's published scope. With this clear delineation established, NFPA 99, a performance code, cannot modify NFPA 70, an installation code. This modification cannot occur because NFPA 99, as a performance code, does not have jurisdiction over installation elements found in NFPA 70, or any other NFPA installation code.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 353-NFPA 99-2015 [Section No. 6.5.2.2.1.4]	
Public Input No. 355-NFPA 99-2015 [Section No. 6.4.2.2.1.5]	
Public Input No. 358-NFPA 99-2015 [Section No. 6.4.2.2.1.6]	

Submitter Information Verification

Submitter Full Name: STEPHEN LIPSTER
Organization: THE ELECTRICAL TRADES CENTER
Affilliation: IBEW
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jul 05 11:32:26 EDT 2015

Committee Statement

Resolution: It is the intention that Article 700 of the NEC apply the life safety branch of the EES. The removal of these sections leaves ambiguous understanding of what the application would be. Maintaining the current language is the best way to identify how the TC envision Article 700 applying to NFPA 99 systems.

Public Input No. 504-NFPA 99-2015 [Section No. 6.5.2.2.2.1]

6.5.2.2.2.1

The life safety branch shall supply power as follows:

(1) Illumination of means of egress in accordance with NFPA 101, *Life Safety Code*

(2) Exit signs and exit directional signs in accordance with NFPA *101*, *Life Safety Code*

(3) Alarm and alerting systems, including the following:

(4) _ Fire alarms

(5) _ Alarms required for systems used for the piping of nonflammable medical gases as specified in Chapter 5

(6) * Communications systems, where used for issuing instructions during emergency conditions

(7) ~~Sufficient lighting in dining and recreation areas to provide illumination to exit ways at a minimum of 5 ft-candles~~

(8)

(9) Task illumination and select receptacles at the generator set location

(10) Elevator cab lighting, control, communications, and signal systems

Statement of Problem and Substantiation for Public Input

This section contains performance requirements which are in conflict of the requirements of NFPA 101.

Submitter Information Verification

Submitter Full Name: JASON DANTONA
Organization: THOMPSON CONSULTANTS INC
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 16:53:37 EDT 2015

Committee Statement

Resolution: FR-29-NFPA 99-2015
Statement: This section contains performance requirements which are in conflict of the requirements of NFPA 101.

Public Input No. 444-NFPA 99-2015 [Section No. 7.3.1]

7.3.1 Information Technology and Communications Systems Infrastructure.

7.3.1.1 Premises Distribution System (Fiber and Copper).

7.3.1.1.1

Cables and installation shall be in compliance with *NFPA 70*, *National Electrical Code*, and TIA/EIA 568-B.

7.3.1.1.2

Distribution system cable labeling, record keeping, and alphanumeric schemes shall be in accordance with TIA/EIA 606-A.

7.3.1.2* Telecommunications Systems' Spaces and Pathways.

7.3.1.2.1 Telecommunications Service Entrance ~~Facility~~ Room (~~EF~~ TSER).

7.3.1.2.1.1 General.

The entrance facility (~~EF~~ TSER) location shall be permitted to be combined with the telecommunications equipment room (TER).

7.3.1.2.1.2

Not less than two physically separated service entrance pathways into this location shall be required.

7.3.1.2.1.3 Remote Primary Data Center.

(A)

In a facility where the primary data center is located remotely, two ~~EFs~~ TSERs and redundant telecommunications service entrances shall be provided.

(B)*

Electronic storage with a minimum capacity to store all inpatient records shall be provided at the building.

7.3.1.2.1.4 Location Requirements and Restrictions.

(A)

The ~~EF~~ TSER shall be permitted to be located with the telecommunications equipment room (TER).

(B)

Where the ~~EF~~ TSER is combined with the TER, the space and electrical power and cabling shall be added to the TER to accommodate the telecommunications service provider's space and access requirements.

(C)*

The ~~EF~~ TSER shall be dedicated to low-voltage communication systems.

(D)

Electrical equipment or fixtures (e.g., transformers, panelboards, conduit, wiring) that are not directly related to the support of the ~~EF~~ TSER shall not be installed in or pass through the ~~EF~~ TSER .

(E)

Mechanical equipment and fixtures (e.g., water or drainage piping of any kind, ductwork, pneumatic tubing) that are not directly related to the support of the ~~EF~~ TSER shall not be installed in, pass through, or enter the ~~EF~~ TSER .

(F)*

The ~~EF~~ TSER shall be located not less than 3.66 m (12 ft) from any permanent source of electromagnetic interference.

(G)

The ~~EF~~ TSER shall be located in an area not subject to flooding.

(H)

The ~~EF~~ TSER shall be as close as practicable to the building communications service entrance point.

7.3.1.2.1.5 Working Space (Reserved).

7.3.1.2.1.6 Security.

Access to ~~EFs~~ TSERs shall be restricted ~~and controlled~~ .

7.3.1.2.1.7 Power Requirements.

(A)

Circuits serving the ~~EF~~ TSER shall be dedicated to serving the ~~EF~~ TSER .

(B)

Circuits serving equipment in the ~~EF~~ TSER shall be connected to the critical branch of the essential electrical system.

(C)

A minimum of one duplex receptacle served from normal power shall be provided on one wall of the ~~EF~~ TSER for service and maintenance.

7.3.1.2.1.8 Environmental Requirements.

(A)

Temperature and humidity in the ~~EF~~ TSER shall be controlled in accordance with the manufacturer's equipment requirements.

(B)*

HVAC systems serving the ~~EF~~ TSER shall be connected to the equipment branch of the essential electrical system.

(C)*

A positive pressure differential with respect to surrounding areas shall be provided.

(D)

Sprinklers shall be provided with wire cages or shall be recessed to prevent accidental operation.

7.3.1.2.1.9 Other Requirements (Reserved).

7.3.1.2.2 ~~Telecommunications~~ Technology Equipment ~~Room~~ Center (~~TER~~ TEC).

Each facility shall have at least one ~~TER~~ TEC space that meets the minimum requirements of this chapter.

7.3.1.2.2.1 General.

(A)

The telecommunications equipment room (~~TER~~ TEC) houses the main networking equipment and shall be permitted to also house application servers and data storage devices that serve the health care facility.

(B)

Central equipment for other communications systems shall be permitted to be housed in the ~~TER~~ TEC .

7.3.1.2.2.2*

~~The entrance facility (EF~~ The Telecommunications Service Entrance Room (TSER) shall be permitted to be combined with the ~~TER~~ TEC space.

7.3.1.2.2.3 Reserved.

7.3.1.2.2.4 Location Requirements and Restrictions.

(A)

Electrical equipment or fixtures (e.g., transformers, panelboards, conduit, wiring) that are not directly related to the support of the ~~TER~~ TEC shall not be installed in, pass through, or enter the ~~TER~~ TEC .

(B)

Any mechanical equipment or fixtures (e.g., water or drainage piping of any kind, ductwork, pneumatic tubing) not directly related to the support of the ~~TER~~ TEC shall not be installed in, pass through, or enter the ~~TER~~ TEC .

(C)

The ~~TER~~ TEC shall be located in a nonsterile area of the facility.

(D)

In geographic areas prone to hurricanes or tornados, the ~~TER~~ TEC shall be located away from exterior curtain walls to prevent wind and water damage.

(E)*

The ~~TER~~ TEC shall be located not less than 3.66 m (12 ft) from any permanent source of electromagnetic interference.

(F)

The ~~TER~~ TEC shall be located or designed to avoid vibration from mechanical equipment or other sources.

7.3.1.2.2.5 Working Space.

Working space about communications cabinets, racks, or other equipment shall be in accordance with 110.26(A) of *NFPA 70*, *National Electrical Code*.

7.3.1.2.2.6 Security.

Access to the ~~TER~~ TEC shall be restricted and controlled.

7.3.1.2.2.7 Power Requirements.

(A)

Circuits serving the ~~TER~~ TEC and the equipment within the ~~TER~~ TEC shall be dedicated to serving the ~~TER~~ TEC .

(B)

Circuits serving fire alarms, medical gas alarms, elevator communications, and communications systems used for issuing instructions during emergency conditions (e.g., fire fighter's phone system) shall be connected to the life safety branch of the essential electrical system.

(C)

Circuits serving other communications equipment in the ~~TER~~ TEC shall be connected to the essential electrical system.

(D)

A minimum of one duplex outlet shall be provided on each wall and shall be connected to normal power for service and maintenance.

(E)

Consideration shall be given to the reliability of power supply to the HVAC equipment because of its important function within the ~~TER~~ TEC .

7.3.1.2.2.8 Environmental Requirements.

(A)

Temperature and humidity in the ~~TER~~ TEC shall be controlled in accordance with the manufacturer's equipment requirements.

(B)

HVAC systems serving the ~~TER~~ TEC shall be connected to the equipment branch of the essential electrical system.

(C)

A positive pressure differential with respect to surrounding areas shall be provided.

7.3.1.2.2.9 Other Requirements (Reserved).

7.3.1.2.3 Telecommunications Room (TR).

7.3.1.2.3.1 General.

A telecommunications room (TR) houses telecommunications equipment, cable terminations, and cross-connect cabling.

7.3.1.2.3.2

Sufficient TRs shall be provided so that any data or communications outlet in the building can be reached without exceeding 90 m (292 ft) maximum pathway distance from the termination point in the TR to the outlet.

7.3.1.2.3.3 Reserved.

7.3.1.2.3.4 Location Requirements and Restrictions.

(A)

Switchboards, panelboards, transformers, and similar electrical equipment that are not directly related to the support of the TR shall not be installed in the TR.

(B)

Any mechanical equipment or fixtures (e.g., water or drainage piping of any kind, ductwork, pneumatic tubing) not directly related to the support of the TR shall not be installed in, pass through, or enter the TR.

(C)

In geographic areas prone to hurricanes or tornados, TRs shall be located away from exterior curtain walls to prevent wind and water damage.

(D)*

The TR shall be located a minimum of 3.66 m (12 ft) from any permanent source of electromagnetic interference.

(E)

A minimum of one TR shall be on each floor of the facility.

(F)

A TR shall serve a maximum of 1858 m^2 (20,000 ft^2) of usable space on a single floor.

7.3.1.2.3.5 Working Space.

Working space about communications cabinets, racks, or other equipment shall be in accordance with 110.26(A) of *NFPA 70, National Electrical Code*.

7.3.1.2.3.6 Security.

Access to TRs shall be restricted and controlled.

7.3.1.2.3.7 Power Requirements.

(A)

Circuits serving the TR and the equipment within the TR shall be dedicated to serving the TR.

(B)

Circuits serving the TR shall be connected to the critical branch of the essential electrical system.

(C)

A minimum of one duplex receptacle shall be provided in each TR and shall be connected to normal power for service and maintenance.

7.3.1.2.3.8 Environmental Requirements.

(A)

Temperature and humidity in the TR shall be controlled in accordance with the manufacturer's equipment requirements.

(B)

Sprinklers shall be provided with wire cages or shall be recessed to prevent accidental discharge.

7.3.1.2.3.9 Other Requirements.

Dropped ceilings shall not be installed in the TR.

7.3.1.2.4 Cabling Pathways and Raceway Requirements.

7.3.1.2.4.1 Backbone Distribution.

Redundant pathways shall be provided between the ~~EF~~ TSER and ~~TER~~ TEC .

7.3.1.2.4.2

Conduits shall be provided for cabling in inaccessible ceiling spaces.

7.3.1.2.5 Outside Plant (OSP) Infrastructure.

7.3.1.2.5.1 General.

Outside plant (OSP) infrastructure shall consist of the conduits, vaults, and other pathways and cabling used to connect buildings on a campus and to provide services from off-campus service providers.

7.3.1.2.5.2 Pathways.

(A)

Dual telecommunications service entrance pathways shall be provided to the TEF.

(B)

Service entrance pathways shall be a minimum of 6.1 m (20 ft) apart.

(C)

Underground conduits for technology systems shall be a minimum of 0.61 m (2 ft) from underground steam and water piping if crossing perpendicularly, and a minimum of 1.83 m (6 ft) if parallel.

(D)

Underground conduits for technology systems shall be a minimum of 0.61 m (2 ft) below grade.

7.3.1.3 Antennas. (Reserved)

Additional Proposed Changes

File Name	Description	Approved
2014_FGI_HOP_communications_systems.docx	2014 FGI communications sections	

Statement of Problem and Substantiation for Public Input

coordinate the terminology of the section with FGI Guidelines. The different terminology is making it confusing to the design community and the AhJ's where both documents are enforced.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 450-NFPA 99-2015 [Section No. 7.4.1.1.1]	
Public Input No. 452-NFPA 99-2015 [Section No. 7.5.1]	

Submitter Information Verification

Submitter Full Name: CHAD BEEBE
Organization: ASHE - AHA
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 14:06:17 EDT 2015

Committee Statement

Resolution: The current terminology is aligned with BISCI standards terminology. Most installers will be more familiar with this terminology

rather than what is proposed and in the FGI guidelines.

Public Input No. 351-NFPA 99-2015 [Section No. 7.3.1.1.2]

7.3.1.1.2

Distribution system cable labeling, record keeping, and alphanumeric schemes shall be in accordance with TIA/EIA 606-A B .

Statement of Problem and Substantiation for Public Input

TIA/EIA 606-B is the current standard for labeling and administration.

Submitter Information Verification

Submitter Full Name: STEPHEN LIPSTER
Organization: THE ELECTRICAL TRADES CENTER
Affilliation: IBEW
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jul 05 11:17:20 EDT 2015

Committee Statement

Resolution: FR-35-NFPA 99-2015
Statement: The reference in 7.3.1.1.2 was updated to the most current.

Section 7.3.1.2.1.3(B) was deleted because requirements for medical record storage are not within the purview of this document.

Section 7.3.1.2.1.4(F) was deleted because the requirement was not enforceable because it failed to quantify the field strength level of electromagnetic interference.

Section 7.3.1.2.1.6 was revised to be less subjective and to better indicate what the committee was looking for to restrict access.

Section 7.3.1.2.2.7(B) was deleted because the requirements are sufficiently addressed within Chapter 6 are not within the scope of this chapter.

Section 7.3.1.2.2.7(E) was deleted because the requirement to give “consideration to the reliability of power” is not quantifiable and therefore is unenforceable language.

The conversion into ft was corrected in Section 7.3.1.2.3.2.

Section 7.3.1.2.3.9 was revised to include both the EF and TER in addition to the TR and to make the installation of drop ceilings a design option rather than outright prohibiting them.

Reference was made to the correct term in Section 7.3.1.2.5.2(A).

Public Input No. 517-NFPA 99-2015 [Section No. 7.3.1.2.1.3(B)]

~~(B)~~ * - –

~~Electronic storage with a minimum capacity to store all inpatient records shall be provided at the building.~~

Statement of Problem and Substantiation for Public Input

Requirements for medical record storage are not within the purview of this document.

Submitter Information Verification

Submitter Full Name: JASON DANTONA
Organization: THOMPSON CONSULTANTS INC
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 17:21:39 EDT 2015

Committee Statement

Resolution: FR-35-NFPA 99-2015
Statement: The reference in 7.3.1.1.2 was updated to the most current.

Section 7.3.1.2.1.3(B) was deleted because requirements for medical record storage are not within the purview of this document.

Section 7.3.1.2.1.4(F) was deleted because the requirement was not enforceable because it failed to quantify the field strength level of electromagnetic interference.

Section 7.3.1.2.1.6 was revised to be less subjective and to better indicate what the committee was looking for to restrict access.

Section 7.3.1.2.2.7(B) was deleted because the requirements are sufficiently addressed within Chapter 6 are not within the scope of this chapter.

Section 7.3.1.2.2.7(E) was deleted because the requirement to give “consideration to the reliability of power” is not quantifiable and therefore is unenforceable language.

The conversion into ft was corrected in Section 7.3.1.2.3.2.

Section 7.3.1.2.3.9 was revised to include both the EF and TER in addition to the TR and to make the installation of drop ceilings a design option rather than outright prohibiting them.

Reference was made to the correct term in Section 7.3.1.2.5.2(A).

Public Input No. 518-NFPA 99-2015 [Section No. 7.3.1.2.1.4(F)]

~~(F)~~ * - –

~~The EF shall be located not less than 3.66 m (12 ft) from any permanent source of electromagnetic interference.~~

Statement of Problem and Substantiation for Public Input

This section is not enforceable because it fails to quantify the field strength level of electromagnetic interference.

Submitter Information Verification

Submitter Full Name: JASON DANTONA
Organization: THOMPSON CONSULTANTS INC
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 17:23:00 EDT 2015

Committee Statement

Resolution: FR-35-NFPA 99-2015
Statement: The reference in 7.3.1.1.2 was updated to the most current.

Section 7.3.1.2.1.3(B) was deleted because requirements for medical record storage are not within the purview of this document.

Section 7.3.1.2.1.4(F) was deleted because the requirement was not enforceable because it failed to quantify the field strength level of electromagnetic interference.

Section 7.3.1.2.1.6 was revised to be less subjective and to better indicate what the committee was looking for to restrict access.

Section 7.3.1.2.2.7(B) was deleted because the requirements are sufficiently addressed within Chapter 6 are not within the scope of this chapter.

Section 7.3.1.2.2.7(E) was deleted because the requirement to give “consideration to the reliability of power” is not quantifiable and therefore is unenforceable language.

The conversion into ft was corrected in Section 7.3.1.2.3.2.

Section 7.3.1.2.3.9 was revised to include both the EF and TER in addition to the TR and to make the installation of drop ceilings a design option rather than outright prohibiting them.

Reference was made to the correct term in Section 7.3.1.2.5.2(A).

Public Input No. 437-NFPA 99-2015 [Section No. 7.3.1.2.1.6]

7.3.1.2.1.6 Security.

Access to EFs shall be restricted ~~and controlled~~ .

Statement of Problem and Substantiation for Public Input

the term "controlled" is subjective and not easily interpreted

Submitter Information Verification

Submitter Full Name: CHAD BEEBE
Organization: ASHE - AHA
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 13:44:32 EDT 2015

Committee Statement

Resolution: FR-35-NFPA 99-2015
Statement: The reference in 7.3.1.1.2 was updated to the most current.

Section 7.3.1.2.1.3(B) was deleted because requirements for medical record storage are not within the purview of this document.

Section 7.3.1.2.1.4(F) was deleted because the requirement was not enforceable because it failed to quantify the field strength level of electromagnetic interference.

Section 7.3.1.2.1.6 was revised to be less subjective and to better indicate what the committee was looking for to restrict access.

Section 7.3.1.2.2.7(B) was deleted because the requirements are sufficiently addressed within Chapter 6 are not within the scope of this chapter.

Section 7.3.1.2.2.7(E) was deleted because the requirement to give “consideration to the reliability of power” is not quantifiable and therefore is unenforceable language.

The conversion into ft was corrected in Section 7.3.1.2.3.2.

Section 7.3.1.2.3.9 was revised to include both the EF and TER in addition to the TR and to make the installation of drop ceilings a design option rather than outright prohibiting them.

Reference was made to the correct term in Section 7.3.1.2.5.2(A).

Public Input No. 519-NFPA 99-2015 [Section No. 7.3.1.2.2.7(B)]

~~(B)~~ –

~~Circuits serving fire alarms, medical gas alarms, elevator communications, and communications systems used for issuing instructions during emergency conditions (e.g., fire fighter's phone system) shall be connected to the life safety branch of the essential electrical system.~~

Statement of Problem and Substantiation for Public Input

These requirements are sufficiently addressed within Chapter 6. Furthermore they are not within the scope of this chapter.

Submitter Information Verification

Submitter Full Name: JASON DANTONA
Organization: THOMPSON CONSULTANTS INC
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 17:24:50 EDT 2015

Committee Statement

Resolution: FR-35-NFPA 99-2015
Statement: The reference in 7.3.1.1.2 was updated to the most current.

Section 7.3.1.2.1.3(B) was deleted because requirements for medical record storage are not within the purview of this document.

Section 7.3.1.2.1.4(F) was deleted because the requirement was not enforceable because it failed to quantify the field strength level of electromagnetic interference.

Section 7.3.1.2.1.6 was revised to be less subjective and to better indicate what the committee was looking for to restrict access.

Section 7.3.1.2.2.7(B) was deleted because the requirements are sufficiently addressed within Chapter 6 are not within the scope of this chapter.

Section 7.3.1.2.2.7(E) was deleted because the requirement to give "consideration to the reliability of power" is not quantifiable and therefore is unenforceable language.

The conversion into ft was corrected in Section 7.3.1.2.3.2.

Section 7.3.1.2.3.9 was revised to include both the EF and TER in addition to the TR and to make the installation of drop ceilings a design option rather than outright prohibiting them.

Reference was made to the correct term in Section 7.3.1.2.5.2(A).

Public Input No. 516-NFPA 99-2015 [Section No. 7.3.1.2.2.7(E)]

~~(E)~~ –

~~Consideration shall be given to the reliability of power supply to the HVAC equipment because of its important function within the TER.~~

-

Statement of Problem and Substantiation for Public Input

The requirement to give “consideration to the reliability of power” is not quantifiable and therefore is unenforceable language and violate the NFPA Manual of Style.

Submitter Information Verification

Submitter Full Name: JASON DANTONA
Organization: THOMPSON CONSULTANTS INC
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 17:13:55 EDT 2015

Committee Statement

Resolution: FR-35-NFPA 99-2015
Statement: The reference in 7.3.1.1.2 was updated to the most current.

Section 7.3.1.2.1.3(B) was deleted because requirements for medical record storage are not within the purview of this document.

Section 7.3.1.2.1.4(F) was deleted because the requirement was not enforceable because it failed to quantify the field strength level of electromagnetic interference.

Section 7.3.1.2.1.6 was revised to be less subjective and to better indicate what the committee was looking for to restrict access.

Section 7.3.1.2.2.7(B) was deleted because the requirements are sufficiently addressed within Chapter 6 are not within the scope of this chapter.

Section 7.3.1.2.2.7(E) was deleted because the requirement to give “consideration to the reliability of power” is not quantifiable and therefore is unenforceable language.

The conversion into ft was corrected in Section 7.3.1.2.3.2.

Section 7.3.1.2.3.9 was revised to include both the EF and TER in addition to the TR and to make the installation of drop ceilings a design option rather than outright prohibiting them.

Reference was made to the correct term in Section 7.3.1.2.5.2(A).

Public Input No. 352-NFPA 99-2015 [Section No. 7.3.1.2.3.2]

7.3.1.2.3.2

Sufficient TRs shall be provided so that any data or communications outlet in the building can be reached without exceeding 90 m (~~292~~ 295 ft) maximum pathway distance from the termination point in the TR to the outlet.

Statement of Problem and Substantiation for Public Input

90 meters equals 295 feet.
The TIA/EIA 568-B standard confirms 90 meters (295 feet) is the correct conversion.

Submitter Information Verification

Submitter Full Name: STEPHEN LIPSTER
Organization: THE ELECTRICAL TRADES CENTER
Affilliation: IBEW
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jul 05 11:21:22 EDT 2015

Committee Statement

Resolution: FR-35-NFPA 99-2015
Statement: The reference in 7.3.1.1.2 was updated to the most current.

Section 7.3.1.2.1.3(B) was deleted because requirements for medical record storage are not within the purview of this document.

Section 7.3.1.2.1.4(F) was deleted because the requirement was not enforceable because it failed to quantify the field strength level of electromagnetic interference.

Section 7.3.1.2.1.6 was revised to be less subjective and to better indicate what the committee was looking for to restrict access.

Section 7.3.1.2.2.7(B) was deleted because the requirements are sufficiently addressed within Chapter 6 are not within the scope of this chapter.

Section 7.3.1.2.2.7(E) was deleted because the requirement to give “consideration to the reliability of power” is not quantifiable and therefore is unenforceable language.

The conversion into ft was corrected in Section 7.3.1.2.3.2.

Section 7.3.1.2.3.9 was revised to include both the EF and TER in addition to the TR and to make the installation of drop ceilings a design option rather than outright prohibiting them.

Reference was made to the correct term in Section 7.3.1.2.5.2(A).

Public Input No. 515-NFPA 99-2015 [Section No. 7.3.1.2.3.9]

~~7.3.1.2.3.9 – Other Requirements.~~

~~Dropped ceilings shall not be installed in the TR.~~

Statement of Problem and Substantiation for Public Input

This requirement does not affect the performance or reliability of the equipment in the space. There are no prevailing Codes or standards which recommend the practice of suspended ceilings in these areas. Designers are free to omit such ceiling systems if they feel it provides increased functionality. There for it is not necessary to mandate this requirement. In addition this requirement is not addressed for TEF or TER spaces in this chapter.

Submitter Information Verification

Submitter Full Name: JASON DANTONA
Organization: THOMPSON CONSULTANTS INC
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 17:11:19 EDT 2015

Committee Statement

Resolution: FR-35-NFPA 99-2015
Statement: The reference in 7.3.1.1.2 was updated to the most current.

Section 7.3.1.2.1.3(B) was deleted because requirements for medical record storage are not within the purview of this document.

Section 7.3.1.2.1.4(F) was deleted because the requirement was not enforceable because it failed to quantify the field strength level of electromagnetic interference.

Section 7.3.1.2.1.6 was revised to be less subjective and to better indicate what the committee was looking for to restrict access.

Section 7.3.1.2.2.7(B) was deleted because the requirements are sufficiently addressed within Chapter 6 are not within the scope of this chapter.

Section 7.3.1.2.2.7(E) was deleted because the requirement to give “consideration to the reliability of power” is not quantifiable and therefore is unenforceable language.

The conversion into ft was corrected in Section 7.3.1.2.3.2.

Section 7.3.1.2.3.9 was revised to include both the EF and TER in addition to the TR and to make the installation of drop ceilings a design option rather than outright prohibiting them.

Reference was made to the correct term in Section 7.3.1.2.5.2(A).

Public Input No. 439-NFPA 99-2015 [Section No. 7.3.1.2.5.2(A)]

(A)

Dual telecommunications service entrance pathways shall be provided to the ~~TEF~~ EF .

Statement of Problem and Substantiation for Public Input

"TEF" is not defined anywhere and it is difficult to determine if this is intended to be the Entrance Facility or if it was a typo and supposed to be the TER - Telecommunications Equipment Room

Submitter Information Verification

Submitter Full Name: CHAD BEEBE
Organization: ASHE - AHA
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 13:51:04 EDT 2015

Committee Statement

Resolution: FR-35-NFPA 99-2015
Statement: The reference in 7.3.1.1.2 was updated to the most current.

Section 7.3.1.2.1.3(B) was deleted because requirements for medical record storage are not within the purview of this document.

Section 7.3.1.2.1.4(F) was deleted because the requirement was not enforceable because it failed to quantify the field strength level of electromagnetic interference.

Section 7.3.1.2.1.6 was revised to be less subjective and to better indicate what the committee was looking for to restrict access.

Section 7.3.1.2.2.7(B) was deleted because the requirements are sufficiently addressed within Chapter 6 are not within the scope of this chapter.

Section 7.3.1.2.2.7(E) was deleted because the requirement to give “consideration to the reliability of power” is not quantifiable and therefore is unenforceable language.

The conversion into ft was corrected in Section 7.3.1.2.3.2.

Section 7.3.1.2.3.9 was revised to include both the EF and TER in addition to the TR and to make the installation of drop ceilings a design option rather than outright prohibiting them.

Reference was made to the correct term in Section 7.3.1.2.5.2(A).

Public Input No. 453-NFPA 99-2015 [Section No. 7.3.3.1]

7.3.3.1 Nurse Call Systems.

7.3.3.1.1* General.

The nurse call systems shall communicate patient and staff calls for assistance and information in health care facilities.

7.3.3.1.1.1

The nurse call systems shall be the audiovisual type or tone visual type and listed for the purpose.

7.3.3.1.1.2

The recognized standard for a listed nurse call system shall be ANSI/UL 1069, *Safety Standard for Hospital Signaling and Nurse Call Equipment*.

~~The locations of staff emergency call~~

7.3.3.1.1. ~~3~~ ~~*~~ —

~~The nurse call system shall provide event notifications for one or more of the following: medical device alarms, staff emergency calls, code calls, and staff or patient requests for help or assistance.~~

~~7.3.3.1.1.4 –~~

~~Primary notification of nurse call events shall be provided by a listed nurse call system in accordance with 7.3.3.1.8 .~~

~~7.3.3.1.1.5 * - –~~

~~Supplemental features shall be permitted to include call notification to alphanumeric pagers and other wireless devices carried by health care facility staff.~~

~~7.3.3.1.2 – Patient Area Call Stations.~~

~~The locations of call stations and calling devices shall be in accordance with the requirements set forth in the FGI Guidelines and as required by state and local codes.~~

~~7.3.3.1.2.1 * - –~~

~~Each patient bed location shall be provided with a call station.~~

~~7.3.3.1.2.2 * - –~~

~~A single call station that provides two-way voice communications shall not serve more than two adjacent beds with calling devices.~~

~~7.3.3.1.2.3 * - –~~

~~Call stations at patient bed locations shall be permitted to provide supplemental signaling of medical device alarms.~~

~~7.3.3.1.2.4 –~~

~~When provided, supplemental signaling of a medical device alarm shall be in accordance with 7.3.3.1.8 .~~

~~7.3.3.1.2.5 –~~

~~Bath stations shall be provided at each inpatient toilet, bath, shower, or sitz bath and shall be accessible to a patient lying on the floor.~~

~~7.3.3.1.2.6 –~~

~~A pull cord shall be permitted to enable access by a patient lying on the floor.~~

~~7.3.3.1.3 – Staff Emergency Call.~~

3 The locations of patient stations, bath stations, emergency staff assistance stations, code call stations, nurse master stations and duty stations shall be in accordance with the requirements set forth in the FGI Guidelines

,

and as required by state and local codes.

~~7.3.3.1.3.1 * - –~~

~~A staff emergency call shall be turned off only at the station, room, or space from where it originates.~~

~~.–~~

7.3.3.1. ~~4~~ ~~*~~ — ~~Code Call.~~

~~The nurse call system shall include provisions to summon assistance from medical emergency resuscitation teams, in locations set forth in the FGI Guidelines and as required by state and local codes.~~

~~7.3.3.~~ 1.4 ~~.1 * - –~~

~~A code call shall be turned off only at the station, room, or space from where it originates.~~

~~7.3.3.1.5~~ –

~~Call stations located in areas where patients are under constant visual surveillance, such as pre-op, recovery, and emergency units shall be permitted to be limited to the staff emergency call and the code call, and two-way communication with the patient bed location shall not be required.~~

~~7.3.3.1.6~~ –

~~Nurse call system provisions shall be provided for geriatric, Alzheimer's, and other dementia units where:~~

(1) ~~- All call stations shall have tamper-resistant fasteners.~~

(2) ~~- Provisions shall be made for the removal or covering of call buttons and outlets.~~

(3) ~~- Call cords or pull strings in excess of 152 mm (6 in.) shall not be permitted.~~

~~7.3.3.1.7~~ –

~~Nurse call system provisions shall not be required in psychiatric units, except for psychiatric seclusion ante/exam rooms where staff emergency call stations shall be provided:~~

(1) ~~- Call stations shall have tamper-resistant fasteners.~~

(2) ~~- Provisions shall be made for the removal or covering of call buttons and outlets.~~

(3) ~~- Call cords or pull strings shall not be permitted.~~

(4) ~~- Control to limit unauthorized use shall be permitted.~~

~~7.3.3.1.8 – Notification Signals.~~

~~The nurse call system shall annunciate each call visibly and audibly to all areas to where calls need to be directed and as required by state and local codes.~~

~~7.3.3.1.8.1~~ –

~~Notification signals for a code call and staff emergency call shall be individually identifiable and distinct from all other nurse call signals.~~

~~7.3.3.1.8.2~~ –

~~Activation of a call station including patient station, bath station, staff emergency station, and code call station shall activate the following notification signals:~~

(1) ~~- Visual signal in the corridor at the patient room door or care space~~

(2) ~~- Visual signals at corridor intersections where individual patient room door or care space signals are not directly visible from the associated nursing station~~

(3) ~~- Visible and audible signals at the nurse master station and associated duty stations~~

(4) ~~- Visible signals at the calling station from which the call originates~~

(5) ~~- A visual or aural signal indication at each audio calling station to indicate voice circuit operation~~

Supplemental features shall be permitted to include call notification to alphanumeric pagers and other wireless devices carried by health care facility staff.

Additional Proposed Changes

File Name	Description	Approved
2014_FGI_HOP_call_systems.docx	2014 FGI Guidelines sections on call systems.	

Statement of Problem and Substantiation for Public Input

These requirements need to be coordinated with the FGI guidelines. Over 40 states have adopted the FGI guidelines which provide the performance requirements for call systems. The FGI committee, which includes clinical, engineering and design input revises its standard for call system device location and functionality based on clinical needs of the patients in many areas of the hospital. This section of NFPA 99 takes a more holistic approach which may not be adequate to address specific patient needs in each department. as such, NFPA 99 should focus more on the installation requirements for these systems and leave the system performance needs to the FGI guidelines committee.

Submitter Information Verification

Submitter Full Name: CHAD BEEBE
Organization: ASHE - AHA
Street Address:
City:

State:

Zip:

Submittal Date: Mon Jul 06 14:28:49 EDT 2015

Committee Statement

Resolution: It is within the scope of NFPA 99 to address the performance of nurse call systems. The current language does defer to the FGI guidelines for locating nurse call devices, but the performance requirements for the system should remain within the purview of this document.

Public Input No. 288-NFPA 99-2015 [Section No. 7.3.3.5]

7.3.3.5 Wireless Phone and Paging Integration. ~~(Reserved)~~

7.3.3.5.1 General. Wireless phone and paging systems which are used for enchanced clinical staff communications and which can be integrated with the nurse call system or with a shared interoperable clinical IT-network shall provide NRTL certified electrical safety and FCC certifications which are appropriate for the intended use.

7.3.3.5.2* Wireless phone and paging systems which are used for enhanced clinical staff communications and notification of nurse call events or interoperable clinical alarm events shall be managed and controlled in accordance with ANSI-AAMI-IEC 80001-1 *Application of risk management for IT-networks incorporating medical devices -- Part 1: Roles, responsibilities and activities* .

A.7.3.3.5.2 Currently, no standard exist for the certification of a wireless communication system having the specific intended use as a clinical alarm communication and notification system. While desirable for enhancing clinical communications and optimizing clinical workflow, these types of communication systems have inherent reliability limitations. For example, there is no notification at a wireless pager when it is out of range for receiving messages and there is no alert at the central station that the communication device is unreachable or return confirmation that a message has been delivered or received.

There may be manufacturers of FDA cleared medical equipment which can have wireless communication capabilities that have been third party NRTL tested to manufacturer specifications and which may be FDA cleared for a specific intended use. Such medical equipment would typically be certified to one or more ANSI-AAMI-IEC 60601 standards (e.g., 60601-1-1 *General requirements for safety* ; 60601-1-2 *Collateral standard for electromagnetic disturbances* ; 60601-1-8 *Collateral standard for alarm systems* ; etc.)

The responsible organization may also contract with a provider of communication equipment to integrate a wireless communication system with nurse call system or with the clinical IT-network for the purposes of enhanced clinical staff communications. However, such an integration would not be NRTL certified to any governing standard.

Therefore, when a wireless communication system is integrated with the clinical IT-network and used as a clinical alarm notification or enhanced communication system, it is necessary for the responsible organization to follow and enact the risk management requirements established in ANSI-AAMI-IEC TIR 80001-1 *Application of risk management for IT-networks incorporating medical devices -- Part 1: Roles, responsibilities and activities* .

Further in this context, the end-to-end system integration and its management need to also conform to the guidelines established in ANSI-AAMI-IEC TIR 80001-2-5 *Application of risk management for IT-networks incorporating medical devices -- Part 2-5: Guidance on distributed alarm systems.*

Statement of Problem and Substantiation for Public Input

There is a need for the NFPA 99 code to establish and define the infrastructure requirements for a clinical IT-network, which is dedicated for use by clinicians and patients. Such a network comprises the servers, switches, routers (etc.) and voice and data communications equipment which are used to transport clinical data and information over a shared IT network infrastructure. Defining the requirements for a Clinical IT network in the NFPA 99 Code will ensure patient and staff safety, safe system operation, overall system effectiveness, and data and system security of personal information and clinical use data which can be transported on the clinical IT network.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 284-NFPA 99-2015 [New Section after 3.3.22]	Definition: Clinical IT-Network
Public Input No. 285-NFPA 99-2015 [Section No. 6.4.2.2.4.2]	Wireless Phone and Paging Equipment on Critical Branch
Public Input No. 292-NFPA 99-2015 [Section No. 7.4.3.5]	

Submitter Information Verification

Submitter Full Name: VINCE BACLAWSKI
Organization: NEMA
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 30 11:24:08 EDT 2015

Committee Statement

Resolution: FR-37-NFPA 99-2015

Statement: There is a need for the NFPA 99 code to establish and define the infrastructure requirements for a clinical IT-network, which is dedicated for use by clinicians and patients. Such a network comprises the servers, switches, routers (etc.) and voice and data communications equipment which are used to transport clinical data and information over a shared IT network infrastructure. Defining the requirements for a Clinical IT network in the NFPA 99 Code will ensure patient and staff safety, safe system operation, overall system effectiveness, and data and system security of personal information and clinical use data which can be transported on the clinical IT network.

Public Input No. 291-NFPA 99-2015 [Section No. 7.3.3.7]

7.3.3.7 _ Clinical Information Systems.

~~(Reserved)~~

7.3.3.7.1* General. The clinical IT-network shall be managed and controlled in accordance with ANSI-AAMI-IEC 80001-1 *Application of risk management for IT-networks incorporating medical devices -- Part 1: Roles, responsiblities and activities* .

(1) The overall responsibility for risk managment of the clinical IT-network shall be that of the responsible organization.

(2) The responsible organization shall establish, maintain and be accountable for the clinical IT-network risk management file.

(3) Top management shall be accountable for all policies, resources and risk managment processes as prescribed in the 80001-1 standard.

(4) Top management shall appoint a clinical IT-network risk manager.

(5) The clinical IT-network risk manager shall be responsible for all duties and requirements prescribed in the 80001-1 standard.

(6) Manufacturers for each device placed on the clinical IT-network shall provide all rquired documentation prescribed in the 80001-1 standard.

(7) Top management shall be accountable for document control and procedures as prescribed in the 80001-1 standard.

A.7.3.3.7.1 _ _ As the clinical environment becomes more and more automated, integrated and evolved there is a need to ensure that the servers and networking equipment which transport interoperable clinical data and communications over a clinical IT-network are properly instituted and sufficiently managed. The ANSI-AAMI-IEC 80001-1 standard for risk management of IT-networks that incorporate medical devices is the governing standard by which the clinical IT-network needs to be managed.

7.3.3.7.2* It shall be permitted for the nurse call system to utilize the interoperable clinical IT-network provided that the nurse call system is listed to ANSI/UL 1069 *Hospital Signaling and Nurse Call Equipment* and certified for use in a "Shared Network" environment.

A.7.3.3.7.2 While all nurse call systems need to be listed to ANSI/UL 1069, not all nurse call systems may be certified for use on a shared clinical IT-network. Only those nurse call systems which are listed for use on a "Shared Network" are permitted to use the clinical IT-network as the means for nurse call system IT-network infrastructure.

7.3.3.7.3* The clinical IT-network shall provide at least two independent pathways where the operational capability of each pathway to each device shall be verified through end-to-end communication.

Exception: When only one single addressable device is served (e.g., an end-point terminal device with a single connection to the clinical IT-network, which is not part of the network infrastructure transporting clinical information between end points), only one pathway shall be required .

A.7.3.3.7.3 To ensure an effective, reliable and resilient clinical IT-network, two independent physical pathways providing network communications need to be provided. Both paths need to be at operational readiness at all times. Operational readiness can be ensured by continuous self-monitoring of each path. All equipment items comprising each clinical IT-network path need to be verified for availability by means of communicaiton. End-point terminal equipment items (e.g., eomputers, monitors, discrete medical devices, discrete devices comprising the nurse call system, etc.), which are connected to but are not part of the clinical IT-network, only require one physical connection to the clinical IT-network.

7.3.3.7.4* The normal and redundant clinical IT-network pathways shall not be permitted to share traffic over the same physical segment.

A.7.3.3.7.4 While each physical path of the clinical IT-network may comprise both hardwired and wireless IT-networking equipment, each path must maintain independent autonomous operational integrity. Network traffic on one path cannot be allowed to cross-over and utilize the same channel of the other path at any time.

7.3.3.7.5 Conditions that affect the operation of the normal and redundant clinical IT-network pathways shall be annunciated as a trouble signal, when minimal operational requirements cannot be met.

7.3.3.7.6* Requirements for utilizing the independent redundant network paths and monitoring the operational integrity of the clinical IT-network shall be established in the clinical IT-network risk management plan maintained by the responsible organization.

A.7.3.3.7.6 Examples for operational monitoring of the clinical IT-network includes but is not limited to the following:

(1) Environmental changeds including risks associated with data and system security vulnerabilities;

(2) Operational/performance feedback from both automated measurement and user feedback (e.g., speed problems, high error rates, equipment failure, malicious software attacks, etc.).

7.3.3.7.7 If monitoring indicates actual or potential conditions causing an increased risk in the operation or performance of the clinical IT-network or any component comprising the network, the event management process established by the responsible organization (per ANSI-AAMI-IEC 80001-1) shall be initiated.

7.3.3.7.8 The event management process for the clinical IT-network shall be documented by the responsible organziation and include at least the following:

(1) Switchover from one pathway to the other when deemed necessary;

(2) Record all negative events and remediation actions;

(3) Reporting of events, actions and findings by the clinical IT-network risk manager;

(4) Evaluate events, reassess risks and propose appropriate changes through change-release management processes; and,

(5) track all corrective and preventive actions leading to closure.

Statement of Problem and Substantiation for Public Input

There is a need for the NFPA 99 code to establish and define the infrastructure requirements for a clinical IT-network, which is dedicated for use by clinicians and patients. Such a network comprises the servers, switches, routers (etc.) and voice and data communications equipment which are used to transport clinical data and information over a shared IT network infrastructure. Defining the requirements for a Clinical IT network in the NFPA 99 Code will ensure patient and staff safety, safe system operation, overall system effectiveness, and data and system security of personal information and clinical use data which can be transported on the clinical IT network.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 284-NFPA 99-2015 [New Section after 3.3.22]	Definition: Clinical IT-Network
Public Input No. 285-NFPA 99-2015 [Section No. 6.4.2.2.4.2]	Power for Clinical IT-Network on Critical Branch
Public Input No. 293-NFPA 99-2015 [Section No. 7.4.3.7]	

Submitter Information Verification

Submitter Full Name: VINCE BACLAWSKI
Organization: NEMA
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 30 11:52:11 EDT 2015

Committee Statement

Resolution: FR-38-NFPA 99-2015

Statement: There is a need for the NFPA 99 code to establish and define the infrastructure requirements for a clinical IT-network, which is dedicated for use by clinicians and patients. Such a network comprises the servers, switches, routers (etc.) and voice and data communications equipment which are used to transport clinical data and information over a shared IT network infrastructure. Defining the requirements for a Clinical IT network in the NFPA 99 Code will ensure patient and staff safety, safe system operation, overall system effectiveness, and data and system security of personal information and clinical use data which can be transported on the clinical IT network.

Public Input No. 450-NFPA 99-2015 [Section No. 7.4.1.1.1]

7.4.1.1.1

HVAC systems serving the ~~TEF~~ EF, the TER, and TRs shall be connected to the essential electrical system.

Statement of Problem and Substantiation for Public Input

TEF is not defined, but EF is.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 444-NFPA 99-2015 [Section No. 7.3.1]	Should PI No. 444 fail committee, then the needs accepted at a minimum. Should 444 be successful then these abbreviations need to be updated to reflect the terminology of that proposal

Submitter Information Verification

Submitter Full Name: CHAD BEEBE
Organization: ASHE - AHA
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 14:19:55 EDT 2015

Committee Statement

Resolution: FR-40-NFPA 99-2015
Statement: This section has been deleted since the connection to the EES is under the jurisdiction of Chapter 6 and is addressed there.

Public Input No. 514-NFPA 99-2015 [Section No. 7.4.1.1.1]

7.4.1.1.1

HVAC systems serving the TEF, the TER, and TRs shall be not connected to the essential electrical system.

Statement of Problem and Substantiation for Public Input

Telephone equipment rooms and closets are required to be part of the critical branch of the essential electrical systems in a type 1 EES 6.4.2.2.4.2 (7). There is no requirement for this equipment to be connected to a type 2 EES and therefore there is no need for HVAC equipment associated with these spaces to be connected to the EES.

Submitter Information Verification

Submitter Full Name: JASON DANTONA
Organization: THOMPSON CONSULTANTS INC
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 17:08:32 EDT 2015

Committee Statement

Resolution: It is the intention the the HVAC for these rooms be connected to the EES in a Type 2 system.

Public Input No. 292-NFPA 99-2015 [Section No. 7.4.3.5]

7.4.3.5 Wireless Phone and Paging Integration. ~~(Reserved)~~

7.4.3.5.1 General. Wireless phone and paging integration systems shall be in accordance with 7.3.3.5.

Statement of Problem and Substantiation for Public Input

There is a need for the NFPA 99 code to establish and define the infrastructure requirements for a clinical IT-network, which is dedicated for use by clinicians and patients. Such a network comprises the servers, switches, routers (etc.) and voice and data communications equipment which are used to transport clinical data and information over a shared IT network infrastructure. Defining the requirements for a Clinical IT network in the NFPA 99 Code will ensure patient and staff safety, safe system operation, overall system effectiveness, and data and system security of personal information and clinical use data which can be transported on the clinical IT network.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 284-NFPA 99-2015 [New Section after 3.3.22]	Definition: Clinical IT-Network
Public Input No. 285-NFPA 99-2015 [Section No. 6.4.2.2.4.2]	Power: Wireless phone and paging equipment on Critical Branch
Public Input No. 288-NFPA 99-2015 [Section No. 7.3.3.5]	Requirements are the same as with Category 1

Submitter Information Verification

Submitter Full Name: VINCE BACLAWSKI
Organization: NEMA
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 30 12:35:12 EDT 2015

Committee Statement

Resolution: FR-42-NFPA 99-2015

Statement: There is a need for the NFPA 99 code to establish and define the infrastructure requirements for a clinical IT-network, which is dedicated for use by clinicians and patients. Such a network comprises the servers, switches, routers (etc.) and voice and data communications equipment which are used to transport clinical data and information over a shared IT network infrastructure. Defining the requirements for a Clinical IT network in the NFPA 99 Code will ensure patient and staff safety, safe system operation, overall system effectiveness, and data and system security of personal information and clinical use data which can be transported on the clinical IT network.

Public Input No. 293-NFPA 99-2015 [Section No. 7.4.3.7]

7.4.3.7 ~~Material Management~~ Clinical Information Systems ~~. (Reserved)~~

7.4.3.7.1 General. Clincial information systems shall be in accordance with 7.3.3.7.

Statement of Problem and Substantiation for Public Input

There is a need for the NFPA 99 code to establish and define the infrastructure requirements for a clinical IT-network, which is dedicated for use by clinicians and patients. Such a network comprises the servers, switches, routers (etc.) and voice and data communications equipment which are used to transport clinical data and information over a shared IT network infrastructure. Defining the requirements for a Clinical IT network in the NFPA 99 Code will ensure patient and staff safety, safe system operation, overall system effectiveness, and data and system security of personal information and clinical use data which can be transported on the clinical IT network.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 284-NFPA 99-2015 [New Section after 3.3.22]	Definition: Clincial IT-Network
Public Input No. 285-NFPA 99-2015 [Section No. 6.4.2.2.4.2]	Power: Clinical IT-Network on Critical Branch
Public Input No. 291-NFPA 99-2015 [Section No. 7.3.3.7]	Requirments are the same as that for Category 1

Submitter Information Verification

Submitter Full Name: VINCE BACLAWSKI
Organization: NEMA
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 30 12:39:55 EDT 2015

Committee Statement

Resolution: FR-43-NFPA 99-2015

Statement: There is a need for the NFPA 99 code to establish and define the infrastructure requirements for a clinical IT-network, which is dedicated for use by clinicians and patients. Such a network comprises the servers, switches, routers (etc.) and voice and data communications equipment which are used to transport clinical data and information over a shared IT network infrastructure. Defining the requirements for a Clinical IT network in the NFPA 99 Code will ensure patient and staff safety, safe system operation, overall system effectiveness, and data and system security of personal information and clinical use data which can be transported on the clinical IT network.

Public Input No. 452-NFPA 99-2015 [Section No. 7.5.1]

7.5.1 Information Technology and Communications Systems Infrastructure.

7.5.1.1

Requirements for information technology and communications systems infrastructure shall be in accordance with 7.3.1, with exceptions as noted in 7.5.1.1.1 through 7.5.1.1.4.

7.5.1.1.1

Dual service entrance pathways into the ~~EF~~ TSER are not required.

7.5.1.1.2

Power circuits serving equipment in the ~~EF~~ TSER , the ~~TER~~ TEC , and TRs shall not be required to be connected to the essential electrical system.

7.5.1.1.3

HVAC systems serving the ~~EF~~ TSER , the ~~ER~~ TEC , and TRs shall not be required to be connected to the essential electrical system.

7.5.1.1.4

Redundant pathways and cabling for the backbone distribution system shall not be required.

Statement of Problem and Substantiation for Public Input

Update terminology to be consistent with FGI. at a minimum 7.5.1.1.3 needs to be fixed since it refers to "ER" which is undefined. I believe it was intended to be "TER"

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 444-NFPA 99-2015 [Section No. 7.3.1]	redefines terminology used throughout the document.

Submitter Information Verification

Submitter Full Name: CHAD BEEBE
Organization: ASHE - AHA
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 14:23:27 EDT 2015

Committee Statement

Resolution: The current terminology is aligned with BISCI standards terminology. Most installers will be more familiar with this terminology rather than what is proposed and in the FGI guidelines.

Public Input No. 443-NFPA 99-2015 [Section No. 9.3.6.5]

9.3.6.5

Indoor storage or manifold areas and storage or manifold buildings for medical gases and cryogenic fluids shall be provided with natural ventilation or mechanical exhaust ventilation in accordance with 9.3.6.5.1 through 9.3.6.8.

9.3.6.5.1 * _

For the purposes of this section the volume of fluid (gas and liquid) to be used in determining the ventilation requirements shall be the volume of the stored fluid when expanded to standard temperature and pressure (STP) of either the largest single vessel in the enclosed space or of the entire volume of the connected vessels that are on a common manifold in the enclosed space, whichever is larger.

9.3.6.5.2 Natural Ventilation.

9.3.6.5.2.1

Natural ventilation shall consist of two nonclosable louvered openings, each having an aggregate free opening area of at least 155 cm^2/35 L (24 $in.^2$/1000 ft^3) of the fluid designed to be stored in the space and in no case less than 465 cm^2 (72 $in.^2$).

9.3.6.5.2.2

One opening shall be located within 30 cm (1 ft) of the floor, and one shall be located within 30 cm (1 ft) of the ceiling.

9.3.6.5.2.3

The openings shall be located to ensure cross ventilation.

9.3.6.5.2.4

Natural ventilation openings shall be directly to the outside atmosphere without ductwork.

9.3.6.5.2.5

Mechanical ventilation shall be provided if natural ventilation requirements cannot be met.

9.3.6.5.3 Mechanical Ventilation.

9.3.6.5.3.1

Mechanical exhaust to maintain a negative pressure in the space shall be provided continuously, unless an alternative design is approved by the authority having jurisdiction.

9.3.6.5.3.2

Mechanical exhaust shall be at a rate of 1 L/sec of airflow for each 300 L (1 cfm per 5 ft^3 of fluid) designed to be stored in the space and not less than 24 L/sec (50 cfm) nor more than 235 L/sec (500 cfm).

9.3.6.5.3.3

Mechanical exhaust inlets shall be unobstructed and shall draw air from within 300 mm (1 ft) of the floor and adjacent to the cylinder or containers.

9.3.6.5.3.4

Mechanical exhaust air fans shall be supplied with electrical power from the essential electrical system.

Exception:

Buildings without essential electrical systems.

9.3.6.5.3.5

Dedicated exhaust systems shall not be required, provided that the system does not connect to spaces that contain combustible or flammable materials.

9.3.6.5.3.6

The exhaust duct material shall be noncombustible.

9.3.6.5.3.7

A means of make-up air shall be provided according to one of the following:

(1) Air shall be permitted via noncombustible ductwork to be transferred from adjacent spaces, from outside the building, or from spaces that do not contain combustible or flammable materials.

(2) Air shall be permitted to be transferred from a corridor under the door ~~up to the greater of 24 L/sec (50 cfm) or 15 percent of the room exhaust~~ in accordance with NFPA 90A, *Standard for the Installation of Air-Conditioning and Ventilating Systems*.

(3) Supply air shall be permitted to be provided from any building ventilation system that does not contain flammable or combustible vapors.

Statement of Problem and Substantiation for Public Input

Some buildings (outpatient facilities) fall under these requirements, however do not have essential electrical systems. It is reasonable to provide them an exception so they do not have to provide emergency power for an exhaust fan.

When mechanically ventilated the rooms operate at a negative pressure. Air transfer should be permitted from adjacent spaces without concern as to the amount transferred.

Submitter Information Verification

Submitter Full Name: MATTHEW T SCIARRETTI
Organization: HEAPY ENGINEERING
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 14:03:22 EDT 2015

Committee Statement

Resolution: 9.3.6.5.3.4- See FR 402. 9.3.6.5.3.7- This maintains coordination with other NFPA standards. The amount transferred is not limited other than the amount under the door. There is inadequate justification to remove the requirement from the code.

Public Input No. 303-NFPA 99-2015 [Section No. 9.3.8]

9.3.8 – Medical Plume Evacuation. ~~Plumes from medical procedures,~~

~~including the use of lasers, shall be captured by one of the following methods :~~ in 9.3.8.1 through 9.3.8.3 below.

~~9.3.8.1 Direct connection to an unfiltered dedicated~~ piped or ducted ~~exhaust system that discharges outside the building~~ with the following characteristics:

~~(1) The system shall be permitted to be filtered or unfiltered and use absorbers to remove noxious materials from the air stream.~~

~~(2) The system shall have dedicated producer(s) and shall not connect to HVAC, medical vacuum, WAGD or housekeeping vacuum producers.~~

~~(3) Inlets shall be permitted to include automatic shutoff devices or to be open flow.~~

~~(4) Flow control for the inlets shall be as appropriate for the plume capture device in use.~~

~~(5) Inlets shall be permitted to be of any design suitable for the plume capture device in use, provided the design does not permit interconnection to any medical vacuum, WAGD or housekeeping vacuum systems also installed in the room.~~

~~9.3.8.2 HEPA filtering and direct connection to a return or exhaust duct .~~

~~9.3.8.3 Chemical and thermal sterilization and return to the space .~~

~~9.3.8.4 The plume evacuation system shall have either:~~

~~(a) an indicator to demonstrate the system is operating within normal parameters or;~~

~~(b) an alarm to indicate the system is not usable.~~

Statement of Problem and Substantiation for Public Input

The requirements in chapter 9 are an ideal starting point for defining these systems. Two standards now in place internationally take these requirements further (ISO 16571 and CSA Z305.13) defining essential safety elements that NFPA can usefully incorporate as follows:
1. some systems include not only filtration but absorbers to reduce objectionable odors.
2. Because plume is known to contain pathogens, viruses and other dangerous material, it is essential that the system not be mixed with other vacuum applications. The temptation will certainly arise as some are similar in pressure or flow, or may appear to offer "economies of scale" when combined.
3 and 4. Inlets for plume evacuation can resemble terminal outlets for medical vacuum, open tubes or inlets for housekeeping vacuum systems. However, their operation is not necessarily like any of these. Thus it makes sense to clarify that the terminal should be designed to mate with the intended capture device and to include such features as are appropriate.
5. The design freedom implied in the preceding clauses cannot be extended to inlet designs which can be inadvertently misconnected.

Submitter Information Verification

Submitter Full Name: MARK ALLEN
Organization: BEACON MEDAES
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jul 01 13:00:22 EDT 2015

Committee Statement

Resolution: FR-401-NFPA 99-2015
Statement: The revised language is meant to provide greater clarity to the types of systems used.

Removed “unfiltered” to allow use of filtered or unfiltered dedicated systems. Defined where the exhaust should discharge for safety reasons.

Specified where the connection point is, and included gas phase filtering to recognize an industry standard practice.

Clarified the section addresses standalone systems.

Public Input No. 103-NFPA 99-2015 [Section No. 10.2.3.6]

10.2.3.6 ~~Multiple Outlet Connection~~ _ Relocatable Power Taps .

Two or more power receptacles supplied by a flexible cord shall be permitted to be used to supply power to plug-connected components of a movable equipment assembly that is pole-, rack-, table-, pedestal-, or cart-mounted, provided that all of the following conditions are met:

(1) The receptacles are permanently attached to the equipment assembly.

(2) * The sum of the ampacity of all appliances connected to the outlets does not exceed 75 percent of the ampacity of the flexible cord supplying the outlets.

(3) The ampacity of the flexible cord is in accordance with *NFPA 70*, *National Electrical Code*.

(4) * The electrical and mechanical integrity of the assembly is regularly verified and documented.

Statement of Problem and Substantiation for Public Input

Change "Multiple Outlet Connections" to "Relocatable Power Taps" for consistency with other ANSI documents (UL 1363 Relocatable Power Taps http://ulstandards.ul.com/standard/?id=1363)

The word "pole-" has been added because the most common relocatable power tap configuration is permanently attached to an IV pole that in turn supplies power to several devices in proximity to the IV pole. This combination is frequently used in Operating Rooms and Catheterization Labs where wall mounted power outlets are mounted far away from the patient. Utilization of these pole-mounted Relocatable Power Taps avoids multiple long power cords from snaking across the floor to the wall periphery outlets, thereby minimizing trip hazards.

Submitter Information Verification

Submitter Full Name: ALAN LIPSCHULTZ
Organization: HEALTHCARE TECHNOLOGY CONSULTING
Affiliation: AAMI (Association for the Advancement of Medical Instrumentation)
Street Address:
City:
State:
Zip:
Submittal Date: Wed May 06 10:42:48 EDT 2015

Committee Statement

Resolution: FR-501-NFPA 99-2015

Statement: This revision reaffirms the revisions adopted under TIA 15-1 (attached for convenience).

Change "Multiple Outlet Connections" to "Relocatable Power Taps" for consistency with other ANSI documents.

The word "pole-" has been added because the most common relocatable power tap configuration is securely attached to an IV pole that in turn supplies power to several devices in proximity to the IV pole. This combination is frequently used in Operating Rooms and Catheterization Labs where wall mounted power outlets are mounted far away from the patient. Utilization of these pole-mounted Relocatable Power Taps avoids multiple long power cords from snaking across the floor to the wall periphery outlets, thereby minimizing trip hazards.

Item (1) was revised and annex material added to clarify permissible attachment methods.

Item (4) was modified to ensure that the attachment method remains secure.

A.10.2.3.6(2): The existing annex material was deleted. Since it is not known in advance where whole-body hyperthermia/hypothermia units will be used, this issue has no bearing on meeting the 75% ampacity requirement. The 75% ampacity requirement has generated lots of confusion in the field as to how to comply. Suggested revised text may alleviate some of that confusion.

A.10.2.3.6(4) The existing annex material is irrelevant to the section to which it is attached and has therefore been deleted.

Public Input No. 305-NFPA 99-2015 [Section No. 10.2.3.6]

10.2.3.6 Multiple Outlet Connection.

Two or more power receptacles supplied by a flexible cord shall be permitted to be used to supply power to plug-connected components of a movable equipment assembly that is rack-, table-, pedestal-, or cart-mounted, provided that all of the following conditions are met:

(1) The receptacles are permanently attached to the equipment assembly.

(2) * The sum of the ampacity of all appliances connected to the outlets does not exceed 75 percent of the ampacity of the flexible cord supplying the outlets.

(3) The ampacity of the flexible cord is in accordance with *NFPA 70*, *National Electrical Code*.

(4) * The electrical and mechanical integrity of the assembly is regularly verified and documented.

(5) * Means are employed to ensure that additional devices or nonmedical equipment cannot be connected to the multiple outlet extension cord after leakage currents have been verified as safe.

Additional Proposed Changes

File Name	Description	Approved
NFPA_99_PC_50.pdf	NFPA 99 PC 50	

Statement of Problem and Substantiation for Public Input

NOTE: This Public Input appeared as "Reject but Hold" in Public Comment No. 50 of the A2017 Second Draft Report for NFPA 99 and per the Regs. at 4.4.8.3.1.

Statement of Problem and Substantiation for Public Comment

Delete 10.2.3.6 (5). It is impractical to completely eliminate the use in hospitals of multiple outlet extension cords that allow clinicians and staff to plug and unplug devices as needed. This need exists not just in the OR. For example, it is often necessary to use three or more infusion pumps, in addition to other devices, on one patient in a patient room. There may not be an adequate number of outlets nearby and running multiple cords, perhaps with extension cords,
can hamper access to the patient and present a trip hazard. Instead, having an appropriate quality and properly maintained multiple outlet extension cord mounted on an IV pole, allows a safe method of powering whatever number of IV pumps is needed for a patient. The committee had agreed to delete Paragraph 10.2.3.6 (5) during the 2012 version revision process, but is was left in as a result of a procedural issue. Additional background has been submitted in a proposed TIA.

Submitter Information Verification

Submitter Full Name: TC ON HEA-PIP
Organization: NFPA 99 TC ON HEALTH CARE FACILITIES MEDICAL EQUIPMENT
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jul 01 15:09:53 EDT 2015

Committee Statement

Resolution: FR-501-NFPA 99-2015
Statement: This revision reaffirms the revisions adopted under TIA 15-1 (attached for convenience).

Change "Multiple Outlet Connections" to "Relocatable Power Taps" for consistency with other ANSI documents.

The word "pole-" has been added because the most common relocatable power tap configuration is securely attached to an IV pole that in turn supplies power to several devices in proximity to the IV pole. This combination is frequently used in Operating Rooms and Catheterization Labs where wall mounted power outlets are mounted far away from the patient. Utilization of these pole-mounted Relocatable Power Taps avoids multiple long power cords from snaking across the floor to the wall periphery outlets, thereby minimizing trip hazards.

Item (1) was revised and annex material added to clarify permissible attachment methods.

Item (4) was modified to ensure that the attachment method remains secure.

A.10.2.3.6(2): The existing annex material was deleted. Since it is not known in advance where whole-body hyperthermia/hypothermia units will be used, this issue has no bearing on meeting the 75% ampacity requirement. The 75% ampacity requirement has generated lots of confusion in the field as to how to comply. Suggested revised text may alleviate some of that confusion.

A.10.2.3.6(4) The existing annex material is irrelevant to the section to which it is attached and has therefore been deleted.

Public Input No. 381-NFPA 99-2015 [Section No. 10.2.5]

10.2.5 Leakage Current — Fixed Equipment.

The leakage current flowing through the ground conductor of the power supply connection to ground of permanently wired appliances installed in general or ~~critical care areas~~ Category 1 space shall not exceed 10.0 mA (ac or dc) with all grounds lifted.

Statement of Problem and Substantiation for Public Input

Definition for Critical Care Area is covered in NFPA 99: 3.3.137 Patient Care Space and is designated as Category 1 Space. Any references in NFPA 99 to “Critical Care Area” should be changed to “Category 1 Space”.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 357-NFPA 99-2015 [Section No. 3.3.28]	

Submitter Information Verification

Submitter Full Name: GARY BECKSTRAND
Organization: UTAH ELECTRICAL JATC
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jul 05 12:38:59 EDT 2015

Committee Statement

Resolution: FR-504-NFPA 99-2015
Statement: The section was revised to correlate with the use of risk categories throughout the document.

Public Input No. 328-NFPA 99-2015 [Section No. 10.3]

10.3 Testing Requirements — ~~Fixed and Portable~~ Patient Care-Related Electrical Appliances and Equipment .

10.3.1* Physical Integrity.

The physical integrity of the power cord assembly composed of the power cord, attachment plug, and cord-strain relief shall be confirmed by visual inspection.

10.3.2* Resistance.

10.3.2.1

For appliances that are used in the patient care vicinity, the resistance between the appliance chassis, or any exposed conductive surface of the appliance, and the ground pin of the attachment plug shall be less than 0.50 ohm under the following conditions:

(1) The cord shall be flexed at its connection to the attachment plug or connector.

(2) The cord shall be flexed at its connection to the strain relief on the chassis.

10.3.2.2

The requirement of 10.3.2.1 shall not apply to accessible metal parts that achieve separation from main parts by double insulation or metallic screening or that are unlikely to become energized (e.g., escutcheons or nameplates, small screws).

10.3.3* Leakage Current Tests.

10.3.3.1 General.

10.3.3.1.1

The requirements in 10.3.3.2 through 10.3.3.4 shall apply to all tests.

10.3.3.1.2

Tests shall be performed with the power switch ON and OFF.

10.3.3.2 Resistance Test.

The resistance tests of 10.3.2 shall be conducted before undertaking any leakage current measurements.

10.3.3.3* Techniques of Measurement.

The test shall not be made on the load side of an isolated power system or separable isolation transformer.

10.3.3.4 Leakage and Touch Current Limits.

The leakage and touch current limits in 10.2.5 and 10.2.6 shall be followed.

10.3.4 Leakage Current — Fixed Equipment.

10.3.4.1

Permanently wired appliances in the patient care vicinity shall be tested prior to installation while the equipment is temporarily insulated from ground.

10.3.5 Touch Current — Portable Equipment.

10.3.5.1

If multiple devices are connected together and one power cord supplies power, the touch current shall be measured as an assembly.

10.3.5.2

When multiple devices are connected together and more than one power cord supplies power, the devices shall be separated into groups according to their power supply cord, and the touch current shall be measured independently for each group as an assembly.

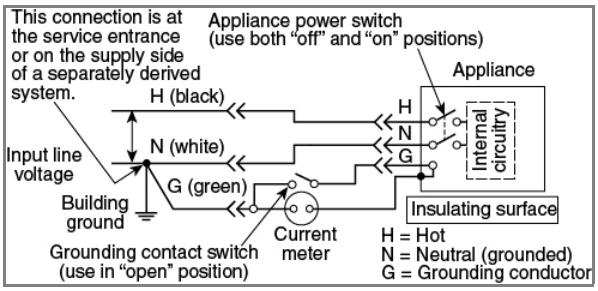
10.3.5.3 Touch Leakage Test Procedure.

Measurements shall be made using the circuit, such as the one illustrated in Figure 10.3.5.3, with the appliance ground broken in two modes of appliance operation as follows:

(1) Power plug connected normally with the appliance on

(2) Power plug connected normally with the appliance off (if equipped with an on/off switch)

Figure 10.3.5.3 Example Test Circuit for Measuring Touch Leakage Current.



10.3.5.3.1

If the appliance has fixed redundant grounding (e.g., permanently fastened to the grounding system), the touch leakage current test shall be conducted with the redundant grounding intact.

10.3.6* Lead Leakage Current Tests and Limits — Portable Equipment.

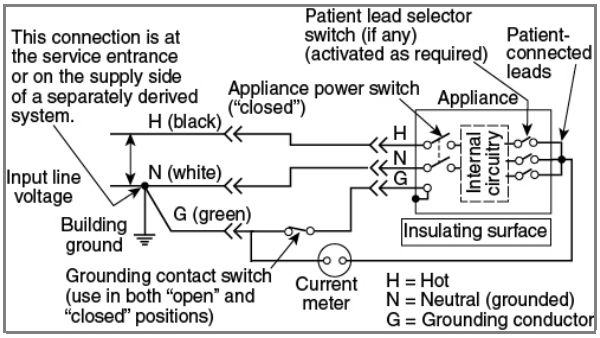
10.3.6.1

The leakage current between all patient leads connected together and ground shall be measured with the power plug connected normally and the device on.

10.3.6.2

An acceptable test configuration shall be as illustrated in Figure 10.3.6.2.

Figure 10.3.6.2 Test Circuit for Measuring Leakage Current Between Patient Leads and Ground — Nonisolated.



10.3.6.3

The leakage current shall not exceed 100 µA for ground wire closed and 500 µA ac for ground wire open.

Statement of Problem and Substantiation for Public Input

Change title of 10.3 to follow pattern set by title of 10.2 to better identify which equipment we are talking about. Existing wording of 10.3 is confusing.

Submitter Information Verification

Submitter Full Name: ALAN LIPSCHULTZ
Organization: HEALTHCARE TECHNOLOGY CONSULTI
Affilliation: AAMI
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jul 02 21:00:22 EDT 2015

Committee Statement

Resolution: FR-505-NFPA 99-2015

Statement: The title of 10.3 has been revised to follow the pattern set by the title of 10.2 to better identify which equipment is referenced.

Public Input No. 405-NFPA 99-2015 [Section No. 10.3.2.2]

10.3.2.2

The requirement of 10.3.2.1 shall not apply to accessible metal parts that achieve separation from main parts by ~~double~~ insulation or metallic screening or that are unlikely to become energized (e.g., escutcheons or nameplates, small screws).

Statement of Problem and Substantiation for Public Input

I would propose to strike the word "double" as being confusing (with Double-Insulated Appliance) and vague (how does user tell if there is double insulation and if it is adequate. The point of the section is that it is pointless for the user to try and take chassis ground measurements on small objects that the manufacturer has insulated from the main chassis.

Submitter Information Verification

Submitter Full Name: ALAN LIPSCHULTZ
Organization: HEALTHCARE TECHNOLOGY CONSULTI
Affilliation: AAMI
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jul 05 19:37:00 EDT 2015

Committee Statement

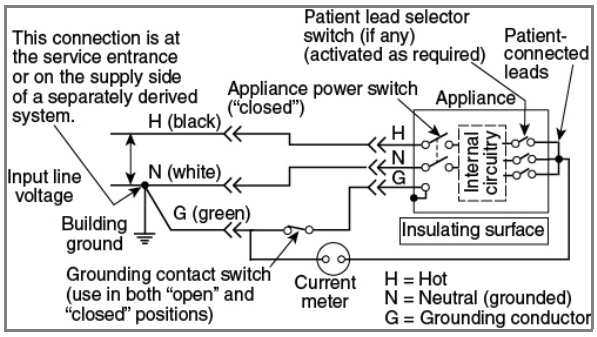
Resolution: FR-506-NFPA 99-2015
Statement: The word "double" was deleted to remove confusion. The use of the term "double insulated" has no bearing on this testing requirement.

Public Input No. 406-NFPA 99-2015 [Section No. 10.3.6.2]

10.3.6.2

An acceptable test configuration shall be as illustrated in Figure 10.3.6.2.

Figure 10.3.6.2 Test Circuit for Measuring Leakage Current Between Patient Leads and Ground — Nonisolated.



Statement of Problem and Substantiation for Public Input

In figure 10.3.6.2, delete the switch in series with the grounding conductor and the label that reads "Grounding contact switch (use in both “open” and “closed” positions)"

Rationale: The presence of this switch (and label) is in conflict with section 10.3.6.2 which does not mention testing lead leakage with the ground "open" and "closed." A requirement should not be stated as part of a figure.

Submitter Information Verification

Submitter Full Name: ALAN LIPSCHULTZ
Organization: HEALTHCARE TECHNOLOGY CONSULTI
Affilliation: AAMI
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jul 05 21:22:20 EDT 2015

Committee Statement

Resolution: FR-507-NFPA 99-2015
Statement: The requirement to test the device with the ground switch in both states was provided only in the figure. It has been incorporated into the main body for consistency.

Public Input No. 407-NFPA 99-2015 [Section No. 10.5.2.4]

10.5.2.4 Devices Likely to Be Used During Defibrillation.

Devices that are critical to patient safety and that are likely to be attached to the patient when a defibrillator is used (such as ECG monitors) shall be rated as ~~"defibrillator~~ "defibrillation proof."

Statement of Problem and Substantiation for Public Input

The problem is that the correct international term is "Defibrillation Proof" as per ANSI/AAMI ES60601-01, section 8.55 and as defined in section 3.20 which reads "3.20 * DEFIBRILLATION-PROOF APPLIED PART: APPLIED PART that is protected against the effects of a discharge of a cardiac defibrillator to the PATIENT."

This section should comply with ES60601-01 and not try and introduce a new term that means the same thing as an internationally defined term.

Submitter Information Verification

Submitter Full Name: ALAN LIPSCHULTZ
Organization: HEALTHCARE TECHNOLOGY CONSULTI
Affilliation: AAMI
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jul 05 21:29:35 EDT 2015

Committee Statement

Resolution: FR-508-NFPA 99-2015
Statement: The requirement was revised to more accurately depict the means of confirming that the device is rated as "defibrillation proof."

Public Input No. 45-NFPA 99-2015 [Section No. 10.5.2.6]

~~10.5.2.6 – Electrical Equipment Systems.~~

~~Purchase contracts for electrical equipment systems, such as nurse call and signaling that consist of interconnected elements, shall require all of the following:~~

(1) - ~~The elements are intended to function together.~~

(2) - ~~The manufacturers provide documentation for such interconnection.~~

(3) - ~~The systems are installed by personnel qualified to do such installations.~~

Additional Proposed Changes

File Name	Description	Approved
PC_60_MED.pdf	NFPA 99_PC60	

Statement of Problem and Substantiation for Public Input

NOTE: The following Public Input appeared as “Reject but Hold” in Public Comment No. 60 of the (A2014) Second Draft Report for NFPA 99 and per the Regs. At 4.4.8.3.1.
Delete 10.5.2.6 and all subsections. This may be interpreted to mean that only components that are sold to be used together can be used together and does not leave the hospital an option for implementing systems that are composed of components not specifically sold for use together, but which are nevertheless compatible. This is a very complex issue and cannot be adequately addressed in a brief statements. Also, it is outside the scope of this document as it is not of primary concern with respect to electrical and fire safety but involves, many other aspects of compatibility (e.g., information systems communication)

Submitter Information Verification

Submitter Full Name: TC ON HEA-MED
Organization: NFPA
Street Address:
City:
State:
Zip:
Submittal Date: Thu Apr 09 14:07:25 EDT 2015

Committee Statement

Resolution: FR-510-NFPA 99-2015
Statement: Delete 10.5.2.6 and all subsections. This requirement is redundant to Chapter 7.

Public Input No. 329-NFPA 99-2015 [Chapter 11]

Chapter 11 Gas Equipment

11.1 Applicability.

11.1.1

This chapter shall apply to the performance, maintenance, and testing of gas equipment in health care facilities, as specified in Section 1.3.

11.1.2*

This chapter shall apply to the use, at normal atmospheric pressure, of all of the following:

(1) Nonflammable medical gases

(2) Vapors and aerosols

(3) Equipment required for the administration of 11.1.2(1) and 11.1.2(2)

11.1.3

When used in this chapter, the term *oxygen* shall be intended to mean 100 percent oxygen as well as mixtures of oxygen and air.

11.1.4*

This chapter shall not apply to special atmospheres, such as those encountered in hyperbaric chambers.

11.1.5* Reserved.

11.2 Cylinder and Container Source.

11.2.1

Cylinders and containers shall comply with 5.1.3.1.

11.2.2

Cylinder valve outlet connections shall conform to CGA V-1, *Standard for Compressed Gas Cylinder Valve Outlet and Inlet Connections* (ANSI B57.1) (includes Pin-Index Safety System for medical gases). *(See 5.1.3.1.4.)*

11.2.3

When low pressure threaded connections are employed, they shall be in accordance with CGA V-5, *Diameter-Index Safety System (Noninterchangeable Low Pressure Connections for Medical Gas Applications)*, for noninterchangeable, low pressure connections for medical gases, air, and suction.

11.2.4

Low pressure quick coupler connections shall be noninterchangeable between gas services.

11.2.5

Pressure reducing regulators and gauges intended for use in high pressure service shall be listed for such service.

11.2.6

Pressure-reducing regulators shall be used on high-pressure cylinders to reduce the cylinder pressure to operating pressures.

11.2.7

Approved pressure reducing regulators or other gas-flow control devices shall be used to reduce the cylinder pressure of every cylinder used for medical purposes. All such devices shall have connections so designed that they attach only to cylinders of gas for which they are designated.

11.2.8*

Equipment that could allow the intermixing of different gases, either through defects in the mechanism or through error in manipulation in any portion of the high pressure side of any system in which these gases might flow, shall not be used for joining cylinders containing compressed gases.

11.2.9

Cylinder valve outlet connections for oxygen shall be Connection No. 540 or Connection No. 870 as described in CGA V-1, *Standard for Compressed Gas Cylinder Valve Outlet and Inlet Connections* (ANSI B57.1).

11.2.10

Cylinder valve outlet connections for nitrous oxide shall be Connection No. 326 or Connection No. 910 as described in CGA V-1, *Standard for Compressed Gas Cylinder Valve Outlet and Inlet Connections* (ANSI B57.1).

11.3 Cylinder and Container Storage Requirements.

11.3.1*

Storage for nonflammable gases equal to or greater than 85 m^3 (3000 ft^3) at STP shall comply with 5.1.3.3.2 and 5.1.3.3.3.

11.3.2*

Storage for nonflammable gases greater than 8.5 m^3 (300 ft^3), but less than 85 m^3 (3000 ft^3), at STP shall comply with the requirements in 11.3.2.1 through 11.3.2.8.

11.3.2.1

Storage locations shall be outdoors in an enclosure or within an enclosed interior space of noncombustible or limited-combustible construction, with doors (or gates outdoors) that can be secured against unauthorized entry.

11.3.2.2

Oxidizing gases, such as oxygen and nitrous oxide, shall not be stored with any flammable gas, liquid, or vapor.

11.3.2.3

Oxidizing gases such as oxygen and nitrous oxide shall be separated from combustibles or flammable materials by one of the following:

(1) Minimum distance of 6.1 m (20 ft)

(2) Minimum distance of 1.5 m (5 ft) if the entire storage location is protected by an automatic sprinkler system designed in accordance with NFPA 13, *Standard for the Installation of Sprinkler Systems*

(3) A gas cabinet constructed per NFPA 30, *Flammable and Combustible Liquids Code*, or NFPA 55, *Compressed Gases and Cryogenics Fluids Code*, if the entire storage location is protected by an automatic sprinkler system designed in accordance with NFPA 13

11.3.2.4

Gas cylinder and cryogenic liquid container storage shall comply with 5.1.3.3.2 and 5.1.3.3.3.

11.3.2.5

Cylinder and container storage locations shall comply with 5.1.3.2.12 with respect to temperature limitations.

11.3.2.6

Cylinder or container restraints shall comply with 11.6.2.3.

11.3.2.7

Smoking, open flames, electric heating elements, and other sources of ignition shall be prohibited within storage locations and within 6.1 m (20 ft) of outside storage locations.

11.3.2.8

Cylinder valve protection caps shall comply with 11.6.2.3.

11.3.3

Storage for nonflammable gases with a total volume equal to or less than 8.5 m^3 (300 ft^3) shall comply with the requirements in 11.3.3.1 and 11.3.3.2.

11.3.3.1

Individual cylinder storage associated with patient care areas, not to exceed 2100 m^2 (22,500 ft^2) of floor area, shall not be required to be stored in enclosures.

11.3.3.2

Precautions in handling cylinders specified in 11.3.3.1 shall be in accordance with 11.6.2.

11.3.3.3

When small-size (A, B, D, or E) cylinders are in use, they shall be attached to a cylinder stand or to medical equipment designed to receive and hold compressed gas cylinders.

11.3.3.4

Individual small-size (A, B, D, or E) cylinders available for immediate use in patient care areas shall not be considered to be in storage.

11.3.3.5

Cylinders shall not be chained to portable or movable apparatus such as beds and oxygen tents.

11.3.4 Signs.

11.3.4.1

A precautionary sign, readable from a distance of 1.5 m (5 ft), shall be displayed on each door or gate of the storage room or enclosure.

11.3.4.2

The sign shall include the following wording as a minimum:

CAUTION

OXIDIZING GAS(ES) STORED WITHIN

NO SMOKING

11.4 Performance Criteria and Testing.

11.4.1 Portable Patient Care Gas Equipment.

11.4.1.1*

Anesthetic apparatus shall be subject to approval by the authority having jurisdiction.

11.4.1.2*

Each yoke on anesthetic apparatus constructed to allow attachment of a small cylinder equipped with a flush-type valve shall have two pins installed as specified in CGA V-1, *Standard for Compressed Gas Cylinder Valve Outlet and Inlet Connections* (ANSI B57.1).

11.4.1.3 Testing.

11.4.1.3.1

Interventions requiring testing shall include, but not be limited to, the following:

(1) Alteration of pipeline hose or pipeline fittings

(2) Alteration of internal piping

(3) Adjustment of selector switches or flush valves

(4) Replacement or repair of flowmeters or bobbins

11.4.1.3.2

After any adjustment or repair involving use of tools, or any modification of the gas piping supply connections or the pneumatic power supply connections for the anesthesia ventilator, or other pneumatically powered device, if one is present, and before use on patients, the gas anesthesia apparatus shall be tested at the final common path to the patient to determine that oxygen, and only oxygen, is delivered from the oxygen flowmeters and the oxygen flush valve, if any.

11.4.1.3.3

Before the gas anesthesia apparatus is returned to service, each fitting and connection shall be checked to verify its proper indexing to the respective gas service involved.

11.4.1.3.4

Before the gas anesthesia apparatus is returned to service, an oxygen analyzer, or a similar device, shall be used to verify the oxygen concentration.

11.4.1.4*

Yoke-type connections between anesthesia apparatus and flush-type cylinder valves (commonly used with anesthetic gas cylinders) shall be of the Connection No. 860 type in accordance with CGA V-1, *Compressed Gas Cylinder Valve Outlet and Inlet Connections* (ANSI B57.1).

11.4.2 Apparatus for Administering Respiratory Therapy.

11.4.2.1

Oxygen-delivery equipment intended to rest on the floor shall be equipped with a base designed to render the entire assembly stable during storage, transport, and use. If casters are used, they shall conform to Class C of U.S. Government Commercial Standard 223-59, *Casters, Wheels, and Glides for Hospital Equipment.*

11.4.2.2

Oxygen enclosures of rigid materials shall be fabricated of noncombustible materials.

11.4.2.3

Equipment supplied from cylinders or containers shall be designed and constructed for service at full cylinder or container pressure or constructed for use with, or equipped with, pressure reducing regulators.

11.4.2.4

Humidification or reservoir jars containing liquid to be dispersed into a gas stream shall be made of transparent or translucent material, shall be impervious to contained solutions and medications, and shall allow observation of the liquid level and consistency.

11.4.2.5

Humidifiers and nebulizers shall be equipped with provisions for overpressure relief or alarm if the flow becomes obstructed.

11.4.2.6

Humidifiers and nebulizers shall be incapable of tipping or shall be mounted so that any tipping or alteration from the vertical shall not interfere with function or accuracy.

11.4.3 Nonpatient Gas Equipment.

11.4.3.1 Carts and Hand Trucks.

11.4.3.1.1 Construction.

Carts and hand trucks for cylinders and containers shall be constructed for the intended purpose, be self-supporting, and be provided with appropriate chains or stays to retain cylinders or containers.

11.4.3.2* Medical Devices.

Medical devices not for patient care and requiring oxygen USP shall meet the following:

(1) Be listed for the intended purpose by the United States Food and Drug Administration

(2) Be under the direction of a licensed medical professional, if connected to the piped distribution system

(3) Not be permanently attached to the piped distribution system

(4) Be installed and used per the manufacturer's instructions

(5) Be equipped with a backflow prevention device

11.5 Administration.

11.5.1 Policies.

Subsection 11.5.11 was revised by a tentative interim amendment (TIA). See page 1.

11.5.1.1 Elimination of Sources of Ignition.

11.5.1.1.1

Smoking materials (e.g., matches, cigarettes, lighters, lighter fluid, tobacco in any form) shall be removed from patients receiving respiratory therapy.

11.5.1.1.2*

When a nasal cannula and its associated supply tubing are delivering oxygen outside of a patient care room, no sources of open flame shall be permitted in the site of intentional expulsion.

11.5.1.1.3*

When any other oxygen delivery equipment not specified in 11.5.1.1.2 is in use, no sources of open flame shall be permitted in the area of administration.

11.5.1.1.4*

Solid fuel-burning appliances shall not be permitted in the area of administration.

11.5.1.1.5*

Sparking toys shall not be permitted in any patient care vicinity.

11.5.1.1.6

Nonmedical appliances that have hot surfaces or sparking mechanisms shall not be permitted within oxygen-delivery equipment or within the site of intentional expulsion.

11.5.1.2 Misuse of Flammable Substances.

11.5.1.2.1

Flammable or combustible aerosols or vapors, such as alcohol, shall not be used in oxygen-enriched atmospheres.

11.5.1.2.2

Oil, grease, or other flammable substances shall not be used on/in oxygen equipment.

11.5.1.2.3

Flammable and combustible liquids shall not be permitted within the site of intentional expulsion.

11.5.1.3 Servicing and Maintenance of Equipment.

11.5.1.3.1

Defective equipment shall be immediately removed from service.

11.5.1.3.2

Areas designated for the servicing of oxygen equipment shall be clean and free of oil, grease, or other flammable substances.

11.5.1.3.3*

A scheduled preventive maintenance program shall be followed.

11.5.2 Gases in Cylinders and Liquefied Gases in Containers.

11.5.2.1 Qualification and Training of Personnel.

11.5.2.1.1*

Personnel concerned with the application and maintenance of medical gases and others who handle medical gases and the cylinders that contain the medical gases shall be trained on the risks associated with their handling and use.

11.5.2.1.2

Health care facilities shall provide programs of continuing education for their personnel.

11.5.2.1.3

Continuing education programs shall include periodic review of safety guidelines and usage requirements for medical gases and their cylinders.

11.5.2.1.4

Equipment shall be serviced only by personnel trained in the maintenance and operation of the equipment.

11.5.2.1.5

If a bulk cryogenic system is present, the supplier shall provide annual training on its operation.

11.5.2.2 Transfilling Cylinders.

11.5.2.2.1

Mixing of compressed gases in cylinders shall be prohibited.

11.5.2.2.2*

Transfilling of gaseous oxygen from one cylinder to another shall be in accordance with the mandatory requirements in CGA P-2.5, *Transfilling of High Pressure Gaseous Oxygen to Be Used for Respiration.*

11.5.2.2.3

Transfilling of any gases from one cylinder to another in the patient care vicinity shall be prohibited.

11.5.2.3 Transfilling Liquid Oxygen.

Transfilling of liquid oxygen shall comply with 11.5.2.3.1 or 11.5.2.3.2, as applicable.

11.5.2.3.1

Transfilling to liquid oxygen base reservoir containers or to liquid oxygen portable containers over 344.74 kPa (50 psi) shall include the following:

(1) A designated area separated from any portion of a facility wherein patients are housed, examined, or treated by a fire barrier of 1 hour fire-resistive construction.

(2) The area is mechanically ventilated, is sprinklered, and has ceramic or concrete flooring.

(3) The area is posted with signs indicating that transfilling is occurring and that smoking in the immediate area is not permitted.

(4) The individual transfilling the container(s) has been properly trained in the transfilling procedures.

11.5.2.3.2*

Where transfilling to liquid oxygen portable containers at 344.74 kPa (50 psi) and under, the following conditions shall be met:

(1) The area is well ventilated and has noncombustible flooring.

(2) The area is posted with signs indicating that smoking in the area is not permitted.

(3) The individual transfilling the liquid oxygen portable container has been properly trained in the transfilling procedure.

(4) The mandatory requirements of CGA P-2.6, *Transfilling of Low-Pressure Liquid Oxygen to Be Used for Respiration*, are met.

11.5.2.4* Filling Cylinders from Oxygen Concentrators.

Filling cylinders from oxygen concentrators, including in the patient care vicinity, shall be in accordance with the manufacturer's instructions, not to exceed the limits in 11.5.2.4.1 through 11.5.2.4.4.

11.5.2.4.1

The cylinder contents shall not exceed 700 L (25 ft^3).

11.5.2.4.2

The flow shall not exceed 5 L/min (0.2 ft^3/min).

11.5.2.4.3

The pressure shall not exceed the DOT rating of the cylinder or 20,700 kPa (3000 psi), whichever is less.

11.5.2.4.4

The cylinders shall be in accordance with DOT requirements or those of the applicable regulatory agency.

11.5.2.5 Ambulatory Patients.

Ambulatory patients on oxygen therapy shall be permitted access to all flame- and smoke-free areas within the health care facility.

11.5.3 Use (Including Information and Warning Signs).

11.5.3.1 Labeling.

11.5.3.1.1

Equipment listed for use in oxygen-enriched atmospheres shall be so labeled.

11.5.3.1.2

Oxygen-metering equipment and pressure reducing regulators shall be conspicuously labeled as follows:

OXYGEN — USE NO OIL

11.5.3.1.3

Flowmeters, pressure reducing regulators, and oxygen-dispensing apparatus shall be clearly and permanently labeled, designating the gas or mixture of gases for which they are intended.

11.5.3.1.4

Apparatus whose calibration or function is dependent on gas density shall be labeled as to the proper supply gas gauge pressure (kPa/psi) for which it is intended.

11.5.3.1.5

Oxygen-metering equipment, pressure reducing regulators, humidifiers, and nebulizers shall be labeled with the name of the manufacturer or supplier.

11.5.3.1.6

Cylinders and containers shall be labeled in accordance with CGA C-7, *Guide to the Preparation of Precautionary Labeling and Marking of Compressed Gas Containers*. Color coding shall not be utilized as a primary method of determining cylinder or container content.

11.5.3.1.7

All labeling shall be durable and withstand cleansing or disinfection.

11.5.3.2* Signs.

11.5.3.2.1

In health care facilities where smoking is not prohibited, precautionary signs readable from a distance of 1.5 m (5 ft) shall be conspicuously displayed wherever supplemental oxygen is in use and in aisles and walkways leading to such an area.

11.5.3.2.2

The signs shall be attached to adjacent doorways or to building walls or be supported by other appropriate means.

11.5.3.2.3

In health care facilities where smoking is prohibited and signs are prominently (strategically) placed at all major entrances, secondary signs with no smoking language shall not be required.

11.5.3.2.4

The nonsmoking policies shall be strictly enforced.

11.5.3.3 Transportation, Storage, and Use of Equipment.

11.5.3.3.1

Flow-control valves on administering equipment shall be closed prior to connection and when not in use.

11.5.3.3.2

Apparatus shall not be stored or transported with liquid agents in reservoirs.

11.5.3.3.3

Care shall be taken in attaching connections from gas services to equipment and from equipment to patients.

11.5.3.3.4

Fixed or adjustable orifice mechanisms, metering valves, pressure reducing regulators, and gauges shall not be connected directly to high pressure cylinders, unless specifically listed for such use and provided with appropriate safety devices.

11.5.3.3.5

Equipment shall only be serviced by qualified personnel.

11.6 Operation and Management of Cylinders.

11.6.1 Administration.

Administrative authorities of health care organizations shall provide policies and procedures for safe practices.

11.6.1.1

Purchase specifications shall include the following:

(1) Specifications for cylinders

(2) Marking of cylinders, regulators, and valves

(3) Proper connections on the cylinders supplied to the facility

11.6.1.2

Training procedures shall include the following:

(1) Maintenance programs in accordance with the manufacturer's recommendations for the piped gas system

(2) Use and transport of equipment and the proper handling of cylinders, containers, hand trucks, supports, and valve protection caps

(3) Verification of gas content and mechanical connection specificity of each cylinder or container prior to placing it into service

11.6.1.3

Policies for enforcement shall include the following:

(1) Regulations for the storage and handling of cylinders and containers of oxygen and nitrous oxide

(2) Prompt evaluation of all signal warnings and all necessary measures taken to re-establish the proper functions of the medical gas and vacuum systems

(3) Organizational capability and resources to cope with a complete loss of any medical gas or vacuum system

(4) Successful completion of all tests required in 5.1.12.3 prior to the use of any medical gas or vacuum piping system for patient care

(5) Locations intended for the delivery vehicle delivering cryogenic liquid to bulk cryogenic liquid systems to remain open and not be used for any other purpose (e.g., vehicle parking, storage of trash containers)

11.6.2 Special Precautions for Handling Oxygen Cylinders and Manifolds.

Handling of oxygen cylinders and manifolds shall be based on CGA G-4, *Oxygen*.

11.6.2.1

Oxygen cylinders, containers, and associated equipment shall be protected from contact with oil or grease by means of the following specific precautions:

(1) Oil, grease, or readily flammable materials shall not be permitted to come in contact with oxygen cylinders, valves, pressure reducing regulators, gauges, or fittings.

(2) Pressure reducing regulators, fittings, or gauges shall not be lubricated with oil or any other flammable substance.

(3) Oxygen cylinders or apparatus shall not be handled with oily or greasy hands, gloves, or rags.

11.6.2.2

Equipment associated with oxygen shall be protected from contamination by means of the following specific precautions:

(1) Particles of dust and dirt shall be cleared from cylinder valve openings by slightly opening and closing the valve before applying any fitting to the cylinder valve.

(2) The high pressure valve on the oxygen cylinder shall be opened slowly before bringing the apparatus to the patient or the patient to the apparatus.

(3) An oxygen cylinder shall not be draped with any materials such as hospital gowns, masks, or caps.

(4) Cylinder-valve protection caps, where provided, shall be kept in place and be hand-tightened, except when cylinders are in use or connected for use.

(5) Valves shall be closed on all empty cylinders in storage.

11.6.2.3

Cylinders shall be protected from damage by means of the following specific procedures:

(1) Oxygen cylinders shall be protected from abnormal mechanical shock, which is liable to damage the cylinder, valve, or safety device.

(2) Oxygen cylinders shall not be stored near elevators or gangways or in locations where heavy moving objects will strike them or fall on them.

(3) Cylinders shall be protected from tampering by unauthorized individuals.

(4) Cylinders or cylinder valves shall not be repaired, painted, or altered.

(5) Safety relief devices in valves or cylinders shall not be tampered with.

(6) Valve outlets clogged with ice shall be thawed with warm — not boiling — water.

(7) A torch flame shall not be permitted, under any circumstances, to come in contact with a cylinder, cylinder valve, or safety device.

(8) Sparks and flame shall be kept away from cylinders.

(9) Even if they are considered to be empty, cylinders shall not be used as rollers, supports, or for any purpose other than that for which the supplier intended them.

(10) Large cylinders (exceeding size E) and containers larger than 45 kg (100 lb) weight shall be transported on a proper hand truck or cart complying with 11.4.3.1.

(11) Freestanding cylinders shall be properly chained or supported in a proper cylinder stand or cart.

(12) Cylinders shall not be supported by radiators, steam pipes, or heat ducts.

11.6.2.4

Cylinders and their contents shall be handled with care, which shall include the following specific procedures:

(1) Oxygen fittings, valves, pressure reducing regulators, or gauges shall not be used for any service other than that of oxygen.

(2) Gases of any type shall not be mixed in an oxygen cylinder or any other cylinder.

(3) Oxygen shall always be dispensed from a cylinder through a pressure reducing regulator.

(4) The cylinder valve shall be opened slowly, with the face of the indicator on the pressure reducing regulator pointed away from all persons.

(5) Oxygen shall be referred to by its proper name, *oxygen*, not air, and liquid oxygen shall be referred to by its proper name, not liquid air.

(6) Oxygen shall not be used as a substitute for compressed air.

(7) The markings stamped on cylinders shall not be tampered with, because it is against federal statutes to change these markings.

(8) Markings used for the identification of contents of cylinders shall not be defaced or removed, including decals, tags, and stenciled marks, except those labels/tags used for indicating cylinder status (e.g., full, in use, empty).

(9) The owner of the cylinder shall be notified if any condition has occurred that might allow any foreign substance to enter a cylinder or valve, giving details and the cylinder number.

(10) Neither cylinders nor containers shall be placed in the proximity of radiators, steam pipes, heat ducts, or other sources of heat.

(11) Very cold cylinders or containers shall be handled with care to avoid injury.

11.6.2.5

Oxygen equipment that is defective shall not be used until one of the following tasks has been performed:

(1) It has been repaired by competent in-house personnel.

(2) It has been repaired by the manufacturer or his or her authorized agent.

(3) It has been replaced.

11.6.2.6

Pressure reducing regulators that are in need of repair or cylinders having valves that do not operate properly shall not be used.

11.6.3 Special Precautions for Making Cylinder and Container Connections.

11.6.3.1

Cylinder valves shall be opened and connected in accordance with the following procedure:

(1) Make certain that apparatus and cylinder valve connections and cylinder wrenches are free of foreign materials.

(2) Turn the cylinder valve outlet away from personnel following these safety procedures:

(a) Stand to the side — not in front and not in back.

(b) Before connecting the apparatus to the cylinder valve, momentarily open the cylinder valve to eliminate dust.

(3) Make connection of the apparatus to the cylinder valve, and tighten the connection nut securely with a wrench.

(4) Release the low-pressure adjustment screw of the pressure-reducing regulator completely.

(5) Slowly open cylinder valve to the full-open position.

(6) Slowly turn in the low-pressure adjustment screw on the pressure reducing regulator until the proper operating pressure is obtained.

(7) Open the valve to the utilization apparatus.

11.6.3.2

Connections for containers shall be made in accordance with the container manufacturer's operating instructions.

11.6.4 Special Precautions for the Care of Safety Mechanisms.

11.6.4.1

Personnel using cylinders and containers and other equipment covered in this chapter shall be familiar with the CGA Pin-Index Safety System and the CGA Diameter-Index Safety System, which are both designed to prevent utilization of the wrong gas.

11.6.4.2

Safety relief mechanisms, noninterchangeable connectors, and other safety features shall not be removed, altered, or replaced.

11.6.5 Special Precautions — Storage of Cylinders and Containers.

11.6.5.1

Storage shall be planned so that cylinders can be used in the order in which they are received from the supplier.

11.6.5.2

If empty and full cylinders are stored within the same enclosure, empty cylinders shall be segregated from full cylinders.

11.6.5.2.1

When the facility employs cylinders with integral pressure gauge, it shall establish the threshold pressure at which a cylinder is considered empty.

11.6.5.3

Empty cylinders shall be marked to avoid confusion and delay if a full cylinder is needed in a rapid manner.

11.6.5.4

Cylinders stored in the open shall be protected as follows:

(1) Against extremes of weather and from the ground beneath to prevent rusting

(2) During winter, against accumulations of ice or snow

(3) During summer, screened against continuous exposure to direct rays of the sun in those localities where extreme temperatures prevail

11.7 Liquid Oxygen Equipment.

11.7.1 General.

The storage and use of liquid oxygen in liquid oxygen base reservoir containers and liquid oxygen portable containers shall comply with the following, or storage and use shall be in accordance with the adopted fire prevention code.

11.7.2 Information and Instructions.

The liquid oxygen seller shall provide the user with documentation that includes, but is not limited to, the following:

(1) Manufacturer's instructions, including labeling for storage and use of the containers

(2) Requirements for storage and use of containers away from ignition sources, exits, electrical hazards, and high-temperature devices

(3) Methods for container restraint to prevent falling

(4) Requirements for container handling

(5) Safeguards for refilling of containers

11.7.3 Container Storage, Use, and Operation.

11.7.3.1*

Containers shall be stored, used, and operated in accordance with the manufacturer's instructions and labeling.

11.7.3.2

Containers shall not be placed in the following areas:

(1) Where they can be tipped over by the movement of a door

(2) Where they interfere with foot traffic

(3) Where they are subject to damage from falling objects

(4) Where exposed to open flames and high-temperature devices

11.7.3.3*

Liquid oxygen base reservoir containers shall be secured by one of the following methods while in storage or use to prevent tipping over caused by contact, vibration, or seismic activity:

(1) Securing to a fixed object with one or more restraints

(2) Securing within a framework, stand, or assembly designed to resist container movement

(3) Restraining by placing the container against two points of contact

11.7.3.4

Liquid oxygen base reservoir containers shall be transported by a cart or hand truck designed for such use, unless a container is equipped with a roller base.

11.7.3.5* Liquid Oxygen Portable Containers.

11.7.3.5.1

Liquid oxygen portable containers shall be kept in an upright position.

11.7.3.5.2

Liquid oxygen portable containers shall not be carried under clothing or other covering.

11.7.3.5.3

Liquid oxygen portable containers shall be kept away from ignition sources, electrical hazards, and high temperature devices during filling and use.

11.7.3.6

The transfilling of containers shall be in accordance with the manufacturer's instructions and the requirements of 11.7.3.6.1 through 11.7.3.6.2.

11.7.3.6.1

Liquid oxygen containers shall be filled outdoors or in compliance with 11.5.2.3.1.

11.7.3.6.1.1*

A drip pan compatible with liquid oxygen shall be provided under the liquid oxygen base reservoir container's filling and vent connections used during the filling process, unless the filling is performed on a noncombustible surface such as concrete.

11.7.3.6.2

Liquid oxygen portable containers shall be permitted to be filled indoors when the liquid oxygen base reservoir container is designed for filling such containers and the written instructions provided by the container manufacturer are followed.

11.7.4 Maximum Quantity.

The maximum total quantity of liquid oxygen permitted in storage and in use in a patient bed location or patient care vicinity shall be 120 L (31.6 gal), provided that the patient bed location or patient care vicinity, or both, are separated from the remainder of the facility by fire barriers and horizontal assemblies having a minimum fire resistance rating of 1 hour in accordance with the adopted building code.

Statement of Problem and Substantiation for Public Input

Chapter 11 has a lot of CGA References; many CGA documents have both mandatory and non-mandatory sections - NFPA 99 cannot have non-mandatory sections.

Issue:
The phrase "the mandatory requirements of…."was missing before references to the CGA documents. This is a part of the CGA requirements and therefore must be added when talking about or listing the requirements.
Proposal:
Add in the phrase "the mandatory requirements of…." Before all references to the documents in Chapter 11.

Submitter Information Verification

Submitter Full Name: ALAN LIPSCHULTZ
Organization: HEALTHCARE TECHNOLOGY CONSULTI
Affilliation: AAMI
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jul 02 21:05:23 EDT 2015

Committee Statement

Resolution: FR-512-NFPA 99-2015
Statement: This addition of these words will resolve conflicts associated with referencing non-mandatory text in a code.

Public Input No. 404-NFPA 99-2015 [New Section after 11.3]

TITLE OF NEW CONTENT

Type your content here ...

11.3.1 The volume of empty cylinders shall not be included in totals used for calculating total gas volumes in sections 11.3.2, 11.3.3 and 11.3.4.

Statement of Problem and Substantiation for Public Input

Existing sections 11.3.1, 11.3.2 and 11.3.3 are vague in terms of how to calculate total gas volume with regard to empty gas cylinders that may be stored in the same locations. It could have been inferred that they should not be included since they don't have any pressurized gas volume, but others might interpret the requirement differently. By adding this section I have tried to make explicit what was only inferred with existing wording.

Submitter Information Verification

Submitter Full Name: ALAN LIPSCHULTZ
Organization: HEALTHCARE TECHNOLOGY CONSULTI
Affilliation: AAMI
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jul 05 19:25:17 EDT 2015

Committee Statement

Resolution: FR-511-NFPA 99-2015
Statement: The section was revised to focus on full cylinders, as opposed to all cylinders, which aligns with the current industry practice.

Public Input No. 326-NFPA 99-2015 [Section No. 11.3]

11.3 Cylinder and Container Storage Requirements.

11.3.1*

Storage for nonflammable gases equal to or greater than 85 m^3 (3000 ft^3) at STP shall comply with 5.1.3.3.2 and 5.1.3.3.3.

11.3.2*

Storage for nonflammable gases greater than 8.5 m^3 (300 ft^3), but less than 85 m^3 (3000 ft^3), at STP shall comply with the requirements in 11.3.2.1 through 11.3.2.8.

11.3.2.1

Storage locations shall be outdoors in an enclosure or within an enclosed interior space of noncombustible or limited-combustible construction, with doors (or gates outdoors) that can be secured against unauthorized entry.

11.3.2.2

Oxidizing gases, such as oxygen and nitrous oxide, shall not be stored with any flammable gas, liquid, or vapor.

11.3.2.3

Oxidizing gases such as oxygen and nitrous oxide shall be separated from combustibles or flammable materials by one of the following:

(1) Minimum distance of 6.1 m (20 ft)

(2) Minimum distance of 1.5 m (5 ft) if the entire storage location is protected by an automatic sprinkler system designed in accordance with NFPA 13, *Standard for the Installation of Sprinkler Systems*

(3) A gas cabinet constructed per NFPA 30, *Flammable and Combustible Liquids Code*, or NFPA 55, *Compressed Gases and Cryogenics Fluids Code*, if the entire storage location is protected by an automatic sprinkler system designed in accordance with NFPA 13

11.3.2.4

Gas cylinder and cryogenic liquid container storage shall comply with 5.1.3.3.2 and 5.1.3.3.3.

11.3.2.5

Cylinder and container storage locations shall comply with 5.1.3.2.12 with respect to temperature limitations.

11.3.2.6

Cylinder or container restraints shall comply with 11.6.2.3.

11.3.2.7

Smoking, open flames, electric heating elements, and other sources of ignition shall be prohibited within storage locations and within 6.1 m (20 ft) of outside storage locations.

11.3.2.8

Cylinder valve protection caps shall comply with 11.6.2.3.

11.3.3

Storage for nonflammable gases with a total volume equal to or less than 8.5 m^3 (300 ft^3) shall comply with the requirements in 11.3.3.1 and 11.3.3.2.

11.3.3.1

Individual cylinder storage associated with patient care areas, not to exceed 2100 m^2 (22,500 ft^2) of floor area, shall not be required to be stored in enclosures.

11.3.3.2

Precautions in handling cylinders specified in 11.3.3.1 shall be in accordance with 11.6.2.

11.3.

~~3.3~~

4 Small-size (A, B, D, or E) cylinders

11.3.4.1

When small-size (A, B, D, or E) cylinders are in use, they shall be attached to a cylinder stand or to medical equipment designed to receive and hold compressed gas cylinders.

11.3.3 4 .4 – 2

Individual small-size (A, B, D, or E) cylinders available for immediate use in patient care areas shall not be considered to be in storage.

11.3.3. 5

Cylinders shall not be chained to portable or movable apparatus such as beds and oxygen tents.

11.3.4 – 6 _ Signs.

11.3.4 6 .1

A precautionary sign, readable from a distance of 1.5 m (5 ft), shall be displayed on each door or gate of the storage room or enclosure.

11.3.4 6 .2

The sign shall include the following wording as a minimum:

CAUTION

OXIDIZING GAS(ES) STORED WITHIN

NO SMOKING

Statement of Problem and Substantiation for Public Input

Section 11.3.3 says "Storage for nonflammable gases with a total volume equal to or less than 8.5 m3 (300 ft3) shall comply with the requirements in 11.3.3.1 and 11.3.3.2"

Sections 11.3.3.3, 11.3.3.4, & 11.3.3.5 should therefore not be subsections of 11.3.3 and I am proposing to move them out of 11.3.3

Submitter Information Verification

Submitter Full Name: ALAN LIPSCHULTZ
Organization: HEALTHCARE TECHNOLOGY CONSULTI
Affilliation: AAMI
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jul 02 20:47:55 EDT 2015

Committee Statement

Resolution: FR-511-NFPA 99-2015
Statement: The section was revised to focus on full cylinders, as opposed to all cylinders, which aligns with the current industry practice.

Public Input No. 403-NFPA 99-2015 [Sections 11.3.1, 11.3.2]

Sections 11.3.1, 11.3.2

11.3.1*

Storage for nonflammable gases equal to or greater than 8.5 m ^{3} (300 ft ^{3}), but less than 85 m^3 (3000 ft^3), at STP shall comply with 5.1.3.3.2 and 5.1.3.3.3.

11.3.2*

Storage for nonflammable gases greater than ~~8.5 m ^{3} (300 ft ^{3}), but less than~~ 85 m^3 (3000 ft^3) ~~,~~ at STP shall comply with the requirements in 11.3.2.1 through 11.3.2.8.

11.3.2.1

Storage locations shall be outdoors in an enclosure or within an enclosed interior space of noncombustible or limited-combustible construction, with doors (or gates outdoors) that can be secured against unauthorized entry.

11.3.2.2

Oxidizing gases, such as oxygen and nitrous oxide, shall not be stored with any flammable gas, liquid, or vapor.

11.3.2.3

Oxidizing gases such as oxygen and nitrous oxide shall be separated from combustibles or flammable materials by one of the following:

(1) Minimum distance of 6.1 m (20 ft)

(2) Minimum distance of 1.5 m (5 ft) if the entire storage location is protected by an automatic sprinkler system designed in accordance with NFPA 13, *Standard for the Installation of Sprinkler Systems*

(3) A gas cabinet constructed per NFPA 30, *Flammable and Combustible Liquids Code*, or NFPA 55, *Compressed Gases and Cryogenics Fluids Code*, if the entire storage location is protected by an automatic sprinkler system designed in accordance with NFPA 13

11.3.2.4

Gas cylinder and cryogenic liquid container storage shall comply with 5.1.3.3.2and 5.1.3.3.3.

11.3.2.5

Cylinder and container storage locations shall comply with 5.1.3.2.12 with respect to temperature limitations.

11.3.2.6

Cylinder or container restraints shall comply with 11.6.2.3.

11.3.2.7

Smoking, open flames, electric heating elements, and other sources of ignition shall be prohibited within storage locations and within 6.1 m (20 ft) of outside storage locations.

11.3.2.8

Cylinder valve protection caps shall comply with 11.6.2.3.

Statement of Problem and Substantiation for Public Input

The way this section originally ready, the intermediate sized storage locations (8.5 m3 (300 ft3), but less than 85 m3 (3000 ft3)) had more restrictions than the largest sized storage locations.

If the committee accepts the logic of my comment, it will make the most sense if the revised sections 11.3.1 and 11.3.2 (and all of its subsections) are reversed so that the largest sized locations (with the most restrictions) goes first, the intermediate sized locations go next (with a subset of restrictions from the largest locations) and the smallest locations (existing section 11.3.3) goes last.

Submitter Information Verification

Submitter Full Name: ALAN LIPSCHULTZ
Organization: HEALTHCARE TECHNOLOGY CONSULTI
Affilliation: AAMI
Street Address:
City:
State:
Zip:

Submittal Date: Sun Jul 05 19:10:56 EDT 2015

Committee Statement

Resolution: The existing text is sufficient. The problem proposed as part of the input does not exist.

Public Input No. 20-NFPA 99-2015 [Section No. 11.3.3.1]

11.3.3.1

Individual cylinder storage associated with patient care areas, not to exceed 2100 m^2 (22,500 ft^2) of floor area, shall not be required to be stored in enclosures.

Statement of Problem and Substantiation for Public Input

There are several reasons for proposing the change. First, it is presumed that the 22,500 sq.ft. area is based upon the maximum area of a smoke compartment as traditionally permitted by NFPA 101. However, not all smoke compartments are 22,500 sq. ft. and there have been proposed changes to increase the permitted area of a smoke compartment. Therefore, if the intent truly is to apply to smoke compartments, the document should say smoke compartment and not refer to an area. Also, if this is the intent, the restriction actually should be included in Paragraph 11.3.3 not in this paragraph.

If the intent is a density restriction, then why not refer to the density or again state that the 300 cu ft limit applies to any 22,500 sq. ft. area in Paragraph 11.3.3.

Submitter Information Verification

Submitter Full Name: William Koffel
Organization: Koffel Associates, Inc.
Street Address:
City:
State:
Zip:
Submittal Date: Wed Mar 25 02:15:48 EDT 2015

Committee Statement

Resolution: The submitter did not provide any recommended changes. The committee has formed a task group to study this requirement for possible revision at the Second Draft stage.

Public Input No. 327-NFPA 99-2015 [Section No. 11.3.3.1]

11.3.3.1

Individual cylinder storage associated with patient care areas, not to exceed 2100 m^2 (22,500 ft^2) of floor area, shall not be required to be stored in enclosures.

Statement of Problem and Substantiation for Public Input

NFPA 101 has for many years defined the maximum permissible size of a smoke compartment as 22,500 ft2. They had proposed increasing this number to 40,000 ft2 last cycle before it was rejected at annual meeting. Change wording to refer to appropriate section of NFPA 101 rather than a specific square footage. Calculating the square footage is also inappropriate and burdensome when the intention is to not cross smoke compartments.

Submitter Information Verification

Submitter Full Name: ALAN LIPSCHULTZ
Organization: HEALTHCARE TECHNOLOGY CONSULTI
Affilliation: AAMI
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jul 02 20:54:51 EDT 2015

Committee Statement

Resolution: The submitter did not provide any recommended changes. The committee has formed a task group to study this requirement for possible revision at the Second Draft stage.

Public Input No. 397-NFPA 99-2015 [Section No. 11.3.3.1]

11.3.3.1

Individual cylinder storage associated with patient care ~~areas~~ spaces , not to exceed 2100 m^2 (22,500 ft^2) of floor area, shall not be required to be stored in enclosures.

Statement of Problem and Substantiation for Public Input

The term "patent care area" is no longer used in NFPA 99. The term is replaced by "patent care space", see 3.3.127.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 398-NFPA 99-2015 [Section No. 11.3.3.1]	
Public Input No. 399-NFPA 99-2015 [Section No. 11.3.3.4]	
Public Input No. 400-NFPA 99-2015 [Section No. A.7.3.3.1.2.1]	
Public Input No. 401-NFPA 99-2015 [Section No. A.11.5.1.1.2]	

Submitter Information Verification

Submitter Full Name: GARY BECKSTRAND
Organization: UTAH ELECTRICAL JATC
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jul 05 13:13:11 EDT 2015

Committee Statement

Resolution: FR-511-NFPA 99-2015
Statement: The section was revised to focus on full cylinders, as opposed to all cylinders, which aligns with the current industry practice.

Public Input No. 398-NFPA 99-2015 [Section No. 11.3.3.1]

11.3.3.1

Individual cylinder storage associated with patient care ~~areas~~ space , not to exceed 2100 m^2 (22,500 ft^2) of floor area, shall not be required to be stored in enclosures.

Statement of Problem and Substantiation for Public Input

The term "patent care area" is no longer used in NFPA 99. The term is replaced by "patent care space", see 3.3.127.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 397-NFPA 99-2015 [Section No. 11.3.3.1]	

Submitter Information Verification

Submitter Full Name: GARY BECKSTRAND
Organization: UTAH ELECTRICAL JATC
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jul 05 13:25:53 EDT 2015

Committee Statement

Resolution: FR-511-NFPA 99-2015
Statement: The section was revised to focus on full cylinders, as opposed to all cylinders, which aligns with the current industry practice.

Public Input No. 399-NFPA 99-2015 [Section No. 11.3.3.4]

11.3.3.4

Individual small-size (A, B, D, or E) cylinders available for immediate use in patient care ~~areas~~ space shall not be considered to be in storage.

Statement of Problem and Substantiation for Public Input

The term "patent care area" is no longer used in NFPA 99. The term is replaced by "patent care space", see 3.3.127.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 397-NFPA 99-2015 [Section No. 11.3.3.1]	

Submitter Information Verification

Submitter Full Name: GARY BECKSTRAND
Organization: UTAH ELECTRICAL JATC
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jul 05 13:27:38 EDT 2015

Committee Statement

Resolution: FR-511-NFPA 99-2015
Statement: The section was revised to focus on full cylinders, as opposed to all cylinders, which aligns with the current industry practice.

Public Input No. 21-NFPA 99-2015 [Section No. 11.3.4.1]

11.3.4.1

A precautionary sign, readable from a distance of 1.5 m (5 ft), shall be displayed on each door or gate of the required storage room or enclosure.

Statement of Problem and Substantiation for Public Input

Less than 300 cu ft of gas per 22,500 sq ft is permitted to be stored WITHOUT an enclosure (NFPA 99 §11.3.3.1). Current wording requires signage on any storage room or enclosure, regardless of the amount of gas stored within. This would result in signage on med rooms, soiled utility rooms, clean utility rooms, etc., which are not intended for storage of gas in excess of 300 cu ft. Proposed change limits the signage requirement to areas intended to store greater than 300 cu ft.

Submitter Information Verification

Submitter Full Name: ALLISON ELLIS
Organization: KOFFEL ASSOC INC
Street Address:
City:
State:
Zip:
Submittal Date: Wed Mar 25 10:50:19 EDT 2015

Committee Statement

Resolution: FR-511-NFPA 99-2015
Statement: The section was revised to focus on full cylinders, as opposed to all cylinders, which aligns with the current industry practice.

Public Input No. 325-NFPA 99-2015 [Section No. 11.4.2.1]

11.4.2.1

Oxygen-delivery equipment intended to rest on the floor shall be equipped with a base designed to render the entire assembly stable during storage, transport, and use. ~~If casters are used, they shall conform to Class C of U.S. Government Commercial Standard 223-59, *Casters, Wheels, and Glides for Hospital Equipment.*~~

Statement of Problem and Substantiation for Public Input

Current section refers to U.S. Commercial Standard 223-59, “Casters, Wheels, and Glides for Hospital Equipment." This standard was withdrawn in October, 1973 (http://gsi.nist.gov/global/docs/vps/csfiles/cs_223-59.pdf). I suggest deleting the second sentence but would be okay with replacing the reference with ANSI ICWM Performance Standard for Casters & Wheels (http://www.casterconcepts.com/wp-content /uploads/2014/08/ANSI-ICWM-2012.pdf)

Submitter Information Verification

Submitter Full Name: ALAN LIPSCHULTZ
Organization: HEALTHCARE TECHNOLOGY CONSULTI
Affilliation: AAMI
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jul 02 19:59:22 EDT 2015

Committee Statement

Resolution: FR-513-NFPA 99-2015
Statement: U.S. Commercial Standard 223-59, “Casters, Wheels, and Glides for Hospital Equipment" was withdrawn in October, 1973.

Public Input No. 445-NFPA 99-2015 [Section No. 11.4.3.2]

~~11.4.3.2~~ ~~*~~ ~~– Medical Devices.~~

~~Medical devices not for patient care and requiring oxygen USP shall meet the following:~~

(1) ~~Be listed for the intended purpose by the United States Food and Drug Administration~~

(2) ~~Be under the direction of a licensed medical professional, if connected to the piped distribution system~~

(3) ~~Not be permanently attached to the piped distribution system~~

(4) ~~Be installed and used per the manufacturer's instructions~~

(5) ~~Be equipped with a backflow prevention device~~

Statement of Problem and Substantiation for Public Input

Chapter 5 clearly prohibits non patient care medical devices from being connected (permanently or temporarily) to the medical gas piped distribution systems. These systems are intended for patient care ONLY. This section should be deleted to eliminate any confusion.

Submitter Information Verification

Submitter Full Name: JONATHAN WILLARD
Organization: ACUTE MEDICAL GAS SERVICES
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 14:08:18 EDT 2015

Committee Statement

Resolution: When the committee originally adopted this text, they considered the safety of moving and using high pressure cylinders, and they determined that it was much safer to use the piped supply for these devices. The safeguards include oversight by a licensed medical professional to ensure patient safety.

Public Input No. 402-NFPA 99-2015 [Section No. 11.5.2.5]

11.5.2.5 Ambulatory Patients.

Ambulatory patients on oxygen therapy shall be permitted access to ~~all~~ any flame- and smoke-free areas within the health care facility.

Statement of Problem and Substantiation for Public Input

Changing "all" to "any" because one reader of this section interpreted "all" to mean that the facility couldn't declare a smoke-free, flame-free area off limits to an ambulatory patient on oxygen therapy.

Submitter Information Verification

Submitter Full Name: ALAN LIPSCHULTZ
Organization: HEALTHCARE TECHNOLOGY CONSULTI
Affilliation: AAMI
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jul 05 18:54:13 EDT 2015

Committee Statement

Resolution: FR-514-NFPA 99-2015
Statement: The requirement was revised to indicate the attributes of the space, rather than the patient access.

Public Input No. 206-NFPA 99-2015 [New Section after 11.6.5]

Special Precautions - Storage of Cylinders and Containers

Inventory control shall be maintained for full and empty nitrous oxide cylinders. Secured access to the nitrous oxide cylinders shall be maintained.

Statement of Problem and Substantiation for Public Input

In CGA P-50, Site Security Standard, any quantity of nitrous oxide is a chemical of concern (COC)/chemical of interest (COI) Tier 4. CGA P-50 section 7.8 provides requirements for COC/COI storage.

Submitter Information Verification

Submitter Full Name: KAREN KOENIG
Organization: CGA
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jun 15 16:06:13 EDT 2015

Committee Statement

Resolution: FR-515-NFPA 99-2015
Statement: Any quantity of nitrous oxide is a chemical of concern (COC)/chemical of interest (COI) Tier 4. CGA P-50 section 7.8 provides requirements for COC/COI storage.

Public Input No. 194-NFPA 99-2015 [New Section after 12.2.2.2]

(Following 12.2.2.2)

At least one representative of senior leadership shall review after action reports and the annual evaluation of the EOP.

Statement of Problem and Substantiation for Public Input

Adding senior leadership review supports Joint Commission requirements introduced in 2014.

Submitter Information Verification

Submitter Full Name: SUSAN MCLAUGHLIN
Organization: MSL HEALTHCARE PARTNERS, INC
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jun 15 12:39:31 EDT 2015

Committee Statement

Resolution: FR-201-NFPA 99-2015
Statement: Adding senior management review supports Joint Commission requirements introduced in 2014. Documentation provides a permanent record of the review and follow-on decisions.

Public Input No. 211-NFPA 99-2015 [New Section after 12.2.2.2]

(Following 12.2.2.2)

Senior organization leadership shall participate in the prioritization of opportunities for improvement identified during exercises and actual events.

Statement of Problem and Substantiation for Public Input

Adding senior leadership review supports Joint Commission requirements introduced in 2014.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 192-NFPA 99-2015 [Section No. 12.5.3.3.9.7]	

Submitter Information Verification

Submitter Full Name: SUSAN MCLAUGHLIN
Organization: MSL HEALTHCARE PARTNERS, INC
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jun 21 16:55:19 EDT 2015

Committee Statement

Resolution: FR-202-NFPA 99-2015
Statement: Adding senior management to direct prioritization of opportunities for improvement is a necessary feature.

Public Input No. 212-NFPA 99-2015 [Section No. 12.2.3.1]

12.2.3.1

The membership of the emergency management committee shall include a chairperson, the emergency program coordinator, a member of senior management, a physician, nursing, and representatives from key areas within the organization, such as ~~physicians~~ , infection control, facilities engineering, safety/industrial hygiene, security, and other key individuals.

Statement of Problem and Substantiation for Public Input

This change supports the Joint Commission requirement for a physician member on the Emergency Management Committee.

Submitter Information Verification

Submitter Full Name: SUSAN MCLAUGHLIN
Organization: MSL HEALTHCARE PARTNERS, INC
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jun 21 17:04:41 EDT 2015

Committee Statement

Resolution: FR-203-NFPA 99-2015
Statement: The requirement has been re-written to clarify key functional areas that must be represented on the committee. Previous language suggested that some key functional areas were optional.

Public Input No. 217-NFPA 99-2015 [New Section after 12.3]

(Add additional category to Table 12-3)

Emergency Management Category 3: Those outpatient facilities that will close during a major emergency.

Statement of Problem and Substantiation for Public Input

Many small outpatient healthcare facilities anticipate closing, not only due to loss of utilities or services, but during a major emergency. These facilities are not addressed in the current edition of the code.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 218-NFPA 99-2015 [Section No. 12.5]	
Public Input No. 219-NFPA 99-2015 [New Section after 12.5.1]	
Public Input No. 220-NFPA 99-2015 [New Section after 12.5.3.3.8.1]	

Submitter Information Verification

Submitter Full Name: SUSAN MCLAUGHLIN
Organization: MSL HEALTHCARE PARTNERS, INC
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 23 07:54:09 EDT 2015

Committee Statement

Resolution: The concept of a Category 3 facility is already incorporated into the existing Category 2 definition. There is no need to distinguish a third category.

Public Input No. 218-NFPA 99-2015 [Section No. 12.5]

12.5 Emergency Management Category 1, Category 2, and ~~Emergency Management~~ Category ~~2~~ 3 Requirements.

12.5.1

All emergency management Category 1 and emergency management Category 2 health care facilities shall be required to develop and maintain an emergency management program that addresses all program elements as prescribed in 12.5.2 and 12.5.3.

12.5.2

The elements and complexity of the subsequent code sections in this chapter shall apply, as appropriate to the hazard vulnerability analysis (HVA), the community's expectations, and the leadership's defined mission of the health care facility.

12.5.3 Program Elements.

12.5.3.1 Hazard Vulnerability Analysis (HVA).

12.5.3.1.1

A hazard vulnerability analysis (HVA) shall be conducted to identify and prioritize hazards that pose a threat to the facility and can affect the demand for its services.

12.5.3.1.2*

The hazards to be considered shall include, but not be limited to, the following:

(1) Natural hazards (geological, meteorological, and biological

(2) Human-caused events (accidental or intentional)

(3) Technological events

12.5.3.1.3

The analysis shall include the potential impact of the hazards on conditions including, but not limited to, the following:

(1) * Continuity of operations

(2) Care for new and existing patients/residents/clients

(3) Health, safety, and security of persons in the affected area

(4) Support of staff

(5) Property, facilities, and infrastructure

(6) Environmental impact

(7) Economic and financial conditions

(8) Regulatory and contractual obligations

(9) Reputation of, or confidence in, the facility

12.5.3.1.4

The facility shall prioritize the hazards and threats identified in the HVA with input from the community.

12.5.3.2 Mitigation.

12.5.3.2.1

The facility shall develop and implement a strategy to eliminate hazards or mitigate the effects of hazards that cannot be eliminated.

12.5.3.2.2

A mitigation strategy shall be developed for priority hazards defined by the HVA.

12.5.3.2.3

The mitigation strategy shall consider, but not be limited to, the following:

(1) Use of applicable building construction standards
(2) Hazard avoidance through appropriate land-use practices
(3) Relocation, retrofitting, or removal of structures at risk
(4) Removal or elimination of the hazard
(5) Reduction or limitation of the amount or size of the hazard
(6) Segregation of the hazard from that which is to be protected
(7) Modification of the basic characteristics of the hazard
(8) Control of the rate of release of the hazard
(9) Provision of protective systems or equipment for both cyber or physical risks
(10) Establishment of hazard warning and communications procedures
(11) Redundancy or duplication of essential personnel, critical systems, equipment, information, operations, or materials

12.5.3.3 Preparedness.

12.5.3.3.1

The facility shall prepare for any emergency as determined by the HVA by organizing and mobilizing essential resources.

12.5.3.3.2

The facility shall maintain a current, documented inventory of the assets and resources it has on-site that would be needed during an emergency, such as medical, surgical, and pharmaceutical resources; water; fuel; staffing; food; and linen.

12.5.3.3.3

The facility shall identify the resource capability shortfalls from 96 hours of sustainability and determine if mitigation activities are necessary and feasible.

12.5.3.3.4

The facility shall establish a protocol for monitoring the quantity of assets and resources as they are utilized.

12.5.3.3.5

The facility shall write an emergency operations plan (EOP) that describes a command structure and the following critical functions within the facility during an emergency:

(1) Communications
(2) Resources and assets
(3) Safety and security
(4) Clinical support activities
(5) Essential utilities
(6) Exterior connections
(7) Staff roles

12.5.3.3.6 Critical Function Strategies.

During the development of the EOP, the facility shall consider the strategies required in 12.5.3.3.6.1 through 12.5.3.3.6.8 in order to manage critical functions during an emergency within the facility.

12.5.3.3.6.1 Communications.

The facility shall plan for the following during an emergency:

(1) Initial notification and ongoing communication of information and instructions to staff

(2) Initial notification and ongoing communication with the external authorities

(3) Communication with the following:

(4) _ Patients and their families (responsible parties)

(5) _ Responsible parties when patients are relocated to alternative care sites

(6) _ Community and the media

(7) _ Suppliers of essential materials, services, and equipment

(8) _ Alternative care sites

(9) Definition of when and how to communicate patient information to third parties

(10)* Establishment of backup communications systems

(11) Cooperative planning with other local or regional health care facilities, including the following:

(12) _ Exchange of information relating to command operations, including contact information

(13) _ Staffing and supplies that could be shared

(14) _ System to locate the victims of the event

12.5.3.3.6.2 Resources and Assets.

The facility shall plan for the following during an emergency:

(1) Acquiring medical, pharmaceutical, and nonmedical supplies

(2) Replacing medical supplies and equipment that will be used throughout response and recovery

(3) Replacing pharmaceutical supplies that will be consumed throughout response and recovery

(4) Replacing nonmedical supplies that will be depleted throughout response and recovery

(5) Managing staff support activities, such as housing, transportation, incident stress debriefing, sanitation, hydration, nutrition, comfort, morale, and mental health

(6) Managing staff family support needs, such as child care, elder care, pet care, and communication to home

(7) Providing staff, equipment, and transportation vehicles needed for evacuation

12.5.3.3.6.3* Safety and Security.

The facility shall plan for the following during an emergency:

(1) Internal security and safety operations

(2) Roles of agencies such as police, sheriff, and national guard

(3) Managing hazardous materials and waste

(4) Radioactive, biological, and chemical isolation and decontamination

(5) Patients susceptible to wandering

(6) Controlling entrance into the health care facility during emergencies

(7) Conducting a risk assessment with applicable authorities if it becomes necessary to control egress from the health care facility

(8) Controlling people movement within the health care facility

(9) Controlling traffic access to the facility

12.5.3.3.6.4 Clinical Support Activities.

The facility shall plan for the following during an emergency:

(1) Clinical activities that could need modification or discontinuation during an emergency, such as patient scheduling, triage, assessment, treatment, admission, transfer, discharge, and evacuation

(2) Clinical services for special needs populations in the community, such as pediatric, geriatric, disabled, and chronically ill patients, and those with addictions (Emergency Management Category 1 only)

(3) Patient cleanliness and sanitation

(4) Behavioral needs of patients

(5) Mortuary services

(6) Evacuation both horizontally and, when required by circumstances, vertically, when the environment cannot support care, treatment, and services

(7) Transportation of patients, and their medications and equipment, and staff to an alternative care site(s) when the environment cannot support care, treatment, and services

(8) Transportation of pertinent patient information, including essential clinical and medication-related information, to an alternative care site(s) when the environment cannot support care, treatment, and services

(9) Documentation and tracking of patient location and patient clinical information

12.5.3.3.6.5* Essential Utilities.

The facility shall plan for the following during an emergency:

(1) Electricity

(2) Potable water

(3) Nonpotable water

(4) HVAC

(5) Fire protection systems

(6) Fuel required for building operations

(7) Fuel for essential transportation

(8) Medical gas and vacuum systems (if applicable)

12.5.3.3.6.6 Exterior Connections.

For essential utility systems in Emergency Management Category 1 facilities only, and based on the facility's HVA, consideration shall be given to the installation of exterior building connectors to allow for the attachment of portable emergency utility modules.

12.5.3.3.6.7 Staff Roles.

(A)

Staff roles shall be defined for the areas of communications, resources and assets, safety and security, essential utilities, and clinical activities.

(B)

Staff shall receive training for their assigned roles in the EOP.

(C)

The facility shall communicate to licensed independent health care providers their roles in the EOP.

(D)

The facility shall provide staff and other personnel with a form of identification, such as identification cards, wrist bands, vests, hats, badges, or computer printouts.

(E)

The facility shall include in its plan the alerting and managing of all staff in an emergency.

12.5.3.3.6.8

The facility shall include the following in its EOP:

(1) * Standard command structure that is consistent with its community

(2) Reporting structure consistent with the command structure

(3) Activation and deactivation of the response and recovery phases, including the authority and process

(4) Facility capabilities and appropriate response efforts when the facility cannot be supported from the outside for extended periods in the six critical areas with an acceptable response, including examples such as the following:

(5) _ Resource conservation

(6) _ Service curtailment

(7) _ Partial or total evacuation consistent with the staff's designated role in community response plan

(8) Alternative treatment sites to meet the needs of the patients

12.5.3.3.7 Staff Education.

12.5.3.3.7.1

Each facility shall implement an educational program in emergency management.

12.5.3.3.7.2

The educational program shall include an overview of the components of the emergency management program and concepts of the incident command system (ICS).

12.5.3.3.7.3

Individuals who are expected to perform as incident commanders or to be assigned to specific positions within the command structure shall be trained in and familiar with the ICS and the particular levels at which they are expected to perform.

12.5.3.3.7.4

Education concerning the staff's specific duties and responsibilities shall be conducted.

12.5.3.3.7.5

General overview education of the emergency management program and the ICS shall be conducted at the time of hire.

12.5.3.3.7.6

Department-/staff-specific education shall be conducted upon appointment to department/staff assignments or positions and annually thereafter.

12.5.3.3.8* Testing Emergency Plans and Operations.

12.5.3.3.8.1

The facility shall test its EOP at least twice annually, either through functional or full-scale exercises or actual events.

12.5.3.3.8.2

Exercises shall be based on the HVA priorities and be as realistic as feasible.

12.5.3.3.8.3

For Emergency Management Category 1 only, an influx of volunteer or simulated patients shall be tested annually, either through a functional or full-scale exercise or an actual event. *(See Table 12.3.)*

12.5.3.3.8.4

Annual table top, functional, or full-scale exercises shall include the following:

(1) Community integration

(2) Assessment of sustainability

12.5.3.3.8.5

For Emergency Management Category 1 only, if so required by the community designation to receive infectious patients, the facility shall conduct at least one exercise a year that includes a surge of infectious patients. *(See Table 12.3.)*

12.5.3.3.8.6

The identified exercises shall be conducted independently or in combination.

12.5.3.3.9 Scope of Exercises.

12.5.3.3.9.1

Exercises shall be monitored by at least one designated evaluator who has knowledge of the facility's plan and who is not involved in the exercise.

12.5.3.3.9.2

Exercises shall monitor the critical functions.

12.5.3.3.9.3

The facility shall conduct a debriefing session not more than 72 hours after the conclusion of the exercise or the event.

12.5.3.3.9.4

The debriefing shall include all key individuals, including observers; administration; clinical staff, including a physician(s); and appropriate support staff.

12.5.3.3.9.5

Exercises and actual events shall be critiqued to identify areas for improvement.

12.5.3.3.9.6

The critiques required by 12.5.3.3.9.5 shall identify deficiencies and opportunities for improvement based upon monitoring activities and observations during the exercise.

12.5.3.3.9.7

Opportunities for improvement identified in critiques shall be incorporated in the facility's improvement plan.

12.5.3.3.9.8*

Improvements made to the emergency management program shall be evaluated in subsequent exercises.

12.5.3.4 Response.

12.5.3.4.1*

The facility shall declare itself in an emergency mode based on current conditions that leadership considers extraordinary.

12.5.3.4.2

Once an emergency mode has been declared, the facility shall activate its EOP.

12.5.3.4.3

The decision to activate the EOP shall be made by the incident commander designated within the plan, in accordance with the facility's activation criteria.

12.5.3.4.4

The decision to deactivate the EOP shall be made by the incident commander in the health care organization in coordination with the applicable external command authority.

12.5.3.4.5*

The organization shall make provisions for emergency credentialing of volunteer clinical staff.

12.5.3.4.5.1

At a minimum, a peer evaluation of skill shall be conducted to validate proficiency for volunteer clinical staff.

12.5.3.4.5.2

Prior to beginning work, the identity of other volunteers offering to assist during response activities shall be verified.

12.5.3.4.5.3

Personnel designated or involved in the EOP of the health care facility shall be supplied with a means of identification, which shall be worn at all times in a visible location.

12.5.3.4.6

The command staff shall actively monitor conditions present in the environment and remain in communication with community emergency response agencies during an emergency response.

12.5.3.4.7

When conditions approach untenable, the command staff, in combination with community emergency response agencies, shall determine when to activate the facility evacuation plan.

12.5.3.4.8

Evacuation to the alternative care site shall follow the planning conducted during the preparedness phase.

12.5.3.4.9*

Crisis standards of care shall be developed through a community-wide approach.

12.5.3.4.10

The decision to implement crisis standards of care shall be coordinated with the community leadership.

12.5.3.4.11

Upon implementation of crisis standards of care in a community, the following shall be considered:

(1) The triage process

(2) The allocation of medical services across the population

12.5.3.4.12 Medical Surge Capacity and Capability.

The requirements of 12.5.3.4.12.1 and 12.5.3.4.12.2 shall apply only to those facilities designated as Emergency Management Category 1 as defined by the HVA.

12.5.3.4.12.1*

The facility shall plan for medical surge capacity and capability.

12.5.3.4.12.2

The triage process shall be implemented as follows:

(1) The arriving victim shall be assessed into the following cohorts:

(2) _ Risk to others, as follows:

(3) _ Mentally unstable

(4) _ Contaminated

(5) _ Infectious

(6) _ Risk to self, as follows:

(7) _ Emotionally impaired

(8) _ Suicidal

(9) _ Risk of death or permanent injury, as follows:

(10) _ Walking wounded

(11) _ Severely injured but stable

(12) _ Suffering from life-threatening injury

(13) _ Beyond care

(14) Patients shall be admitted for treatment depending on facility capacity, the facility's specialty, and clinical need.

(15) Creation of ancillary clinical space shall have adequate utility support for the following:

(16) _ HVAC

(17) _ Sanitation

(18) _ Lighting

(19) _ Proximity to operating room (OR)

12.5.3.4.13

Recovery from controlled reduction in care standards shall be reversed at the earliest feasible time.

12.5.3.4.14

Health care facilities shall have a designated media spokesperson to facilitate news releases during the response process.

12.5.3.4.15

An area shall be designated for media representatives to assemble where they will not interfere with the operations of the health care facility.

12.5.3.5* Recovery.

12.5.3.5.1

Plans shall reflect measures needed to restore operational capability to pre-disaster levels.

12.5.3.5.2

Fiscal aspects shall be considered with respect to restoration costs and possible cash flow losses associated with the disruption.

12.5.3.5.3

Facility leadership shall accept and accommodate federal, state, and local assistance that will be beneficial for recovery of operations.

12.5.3.5.4

No party to recovery shall take action to unfairly limit lawful competition once recovery operations are completed.

12.5.3.5.5

Recovery shall not be deemed complete until infection control decontamination efforts are validated.

12.5.3.6 Administration.

12.5.3.6.1

The facility shall modify its HVA, EOP, supply chain (including the current emergency supplies inventory), and other components of the emergency management program, as a result of exercises, real event, and annual review.

12.5.3.6.2

The facility shall maintain written records of drills, exercises, and training as required by this chapter for a period of 3 years.

Statement of Problem and Substantiation for Public Input

Accounts for the addition of emergency management category 3.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 217-NFPA 99-2015 [New Section after 12.3]	This addition is linked to subsequent PI's on the requirements for emergency management category 3 facilities.

Submitter Information Verification

Submitter Full Name: SUSAN MCLAUGHLIN
Organization: MSL HEALTHCARE PARTNERS, INC
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 23 08:02:09 EDT 2015

Committee Statement

Resolution: The concept of a Category 3 facility is already incorporated into the existing Category 2 definition. There is no need to distinguish a third category.

Public Input No. 219-NFPA 99-2015 [New Section after 12.5.1]

(Add new sections following 12.5.1)

Emergency management category 3 facilities that are affiliated with category 1 or 2 facilities shall be incorporated into and adhere to the affiliated organization's emergency management program.

Emergency management category 3 facilities that are independent shall comply with section 12.5.3.1, (the applicable new section under setion 12.5.3.3.8), 12,5.3.3.8.2, section 12.5.3.3.9.5, section 12.5.3.3.9.6, and section 12.5.3.3.9.7.

Statement of Problem and Substantiation for Public Input

This new material would define the compliance expectations for emergency management category 3 facilities.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 217-NFPA 99-2015 [New Section after 12.3]	This addition is linked to subsequent PI's on the requirements for emergency management category 3 facilities.

Submitter Information Verification

Submitter Full Name: SUSAN MCLAUGHLIN
Organization: MSL HEALTHCARE PARTNERS, INC
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 23 08:04:24 EDT 2015

Committee Statement

Resolution: The concept of a Category 3 facility is already incorporated into the existing Category 2 definition. There is no need to distinguish a third category.

Public Input No. 448-NFPA 99-2015 [Section No. 12.5.3.3.6.5]

12.5.3.3.6.5* Essential Utilities.

The facility shall plan for the following during an emergency:

(1) Electricity
(2) Potable water
(3) Nonpotable water
(4) HVAC
(5) Fire protection systems
(6) Fuel required for building operations
(7) Fuel for essential transportation
(8) Medical gas and vacuum systems ~~(if applicable)~~

Statement of Problem and Substantiation for Public Input

Many of the utilities listed may or may not be applicable (i.e. HVAC). There are many HVAC components that may not be considered "essential." This is the same for medical gases. The essential nature of these utilities should be evaluated based on a risk assessment. There is no need to include "(if applicable)" for medical gas and vacuum systems.

Submitter Information Verification

Submitter Full Name: JONATHAN WILLARD
Organization: ACUTE MEDICAL GAS SERVICES
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 14:16:37 EDT 2015

Committee Statement

Resolution: FR-204-NFPA 99-2015
Statement: The changes recognize that some of the utilities may or may not be present in every facility. Additional utilities thought to be essential have been incorporated.

Public Input No. 220-NFPA 99-2015 [New Section after 12.5.3.3.8.1]

(Following section 12.5.3.3.8.1)

Emergency management category 3 facilities that are affiliated with a category 1 or 2 organization shall test the emergency management program at least once annually as prescribed in the affiliated organization's EOP.

Emergency management category 3 facilities that are independent shall test the emergency management program at least once annually.

Statement of Problem and Substantiation for Public Input

This addition sets the emergency exercise requirements for the newly-created emergency management category 1 facilities.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 217-NFPA 99-2015 [New Section after 12.3]	This addition is linked to subsequent PI's on the requirements for emergency management category 3 facilities.

Submitter Information Verification

Submitter Full Name: SUSAN MCLAUGHLIN
Organization: MSL HEALTHCARE PARTNERS, INC
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 23 08:14:18 EDT 2015

Committee Statement

Resolution: The concept of a Category 3 facility is already incorporated into the existing Category 2 definition. There is no need to distinguish a third category.

Public Input No. 192-NFPA 99-2015 [Section No. 12.5.3.3.9.7]

12.5.3.3.9.7

Opportunities for improvement identified in critiques shall be incorporated in the facility's improvement plan, based on prioritization by senior organization leadership .

Statement of Problem and Substantiation for Public Input

Adding senior leadership review supports Joint Commission requirements introduced in 2014.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 211-NFPA 99-2015 [New Section after 12.2.2.2]	These 2 inputs add the requirement for senior leadership review from different perspectives.

Submitter Information Verification

Submitter Full Name: SUSAN MCLAUGHLIN
Organization: MSL HEALTHCARE PARTNERS, INC
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jun 15 12:28:25 EDT 2015

Committee Statement

Resolution: See new 12.2.2.4 (FR 202).

Public Input No. 193-NFPA 99-2015 [New Section after 12.5.3.4.5.3]

(Following 12.5.3.4.5.3)

Identification issued to volunteers shall distinguish volunteers from staff members.

Statement of Problem and Substantiation for Public Input

This change supports the Joint Commission requirement for volunteers to be distinguished from staff members.

Submitter Information Verification

Submitter Full Name: SUSAN MCLAUGHLIN
Organization: MSL HEALTHCARE PARTNERS, INC
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jun 15 12:36:25 EDT 2015

Committee Statement

Resolution: FR-205-NFPA 99-2015
Statement: Volunteers must be distinguished from staff to assure patient safety and appropriate supervision.

Public Input No. 506-NFPA 99-2015 [Section No. 12.5.3.4.13]

12.5.3.4.13

~~Recovery from controlled~~ Any controlled reduction in care standards executed as a response to the emergency shall be reversed at the earliest feasible time.

Statement of Problem and Substantiation for Public Input

The wording of this clause is awkward. The proposed wording is an attempt at improved clarity.

Submitter Information Verification

Submitter Full Name: MARK ALLEN
Organization: BEACON MEDAES
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 16:55:33 EDT 2015

Committee Statement

Resolution: FR-206-NFPA 99-2015
Statement: Section was renumbered for clarity.

The AHJ establishes acceptable standards of care and must approve alternatives to these standards.

12.5.3.4.9.3 was moved from 12.5.3.4.13 and revised to use consistent terminology.

Public Input No. 191-NFPA 99-2015 [Section No. 12.5.3.6.1]

12.5.3.6.1

The facility shall modify its HVA, EOP, supply chain (including the current emergency supplies inventory), and other components of the emergency management program, as a result of exercises, real ~~event~~ events , and annual review.

Statement of Problem and Substantiation for Public Input

Editorial.

Submitter Information Verification

Submitter Full Name: SUSAN MCLAUGHLIN
Organization: MSL HEALTHCARE PARTNERS, INC
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jun 15 12:22:37 EDT 2015

Committee Statement

Resolution: FR-208-NFPA 99-2015
Statement: The revised text recognizes that modifications are not always needed.

Public Input No. 213-NFPA 99-2015 [New Section after 13.3.1]

(Following 13.3.1)

The content of the SVA shall be updated as needed based on current events.

Statement of Problem and Substantiation for Public Input

Many hospitals utilize the same format for the SVA each year, without considering additional potential events to be ranked.

Submitter Information Verification

Submitter Full Name: SUSAN MCLAUGHLIN
Organization: MSL HEALTHCARE PARTNERS, INC
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jun 21 17:32:30 EDT 2015

Committee Statement

Resolution: FR-210-NFPA 99-2015
Statement: Many hospitals utilize the same threat list for the SVA each year, without considering additional potential events to be ranked.

Public Input No. 214-NFPA 99-2015 [Section No. 13.5.3]

13.5.3

Pediatric and infant care areas shall have a security plan for the prevention of, and response to, pediatric and infant abduction that shall include appropriate protections, such as the following:

(1) Control and limitation of access by the general public

(2) Screening by nursing prior to allowing persons access to infant care areas

(3) Matching protocol with staff clearance to pair infants with parents

(4) System to monitor and track the location of pediatric and infant patients

(5) * Facility alert system, lockdown, and staff inspection of all packages leaving the premises

(6) Use of electronic monitoring, tracking, and access control equipment

(7) Use of an automated and standardized facility-wide alerting system to announce pediatric or infant abduction

(8) Remote exit locking or alarming

(9) ~~Facility lockdown procedures and staff inspection of all persons and packages leaving the premises~~

(10)

(11) Prohibition on birth announcements by staff

(12) Detection of the presence of nonidentified individual constitutes security breach

(13) Movement of infants restricted to basinets only — no hand carries

(14) Health care staff wear unique identification or uniforms

(15) Secure storage of scrubs and uniforms, both clean and dirty

(16) Education in pediatric and infant abduction as follows:

(17) Health care staff are familiar with infant abduction scenarios.

(18) Parents know not to leave a child or an infant unattended or in the care of an unidentified person.

(19) Visiting family and friends not permitted to enter any nursery area with an infant or a newborn from the outside

(20) Infant abduction drills conducted periodically to test effectiveness of chosen measures

Statement of Problem and Substantiation for Public Input

The deleted material is redundant to item (5) in the same section.

Submitter Information Verification

Submitter Full Name: SUSAN MCLAUGHLIN
Organization: MSL HEALTHCARE PARTNERS, INC
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jun 21 17:36:43 EDT 2015

Committee Statement

Resolution: FR-211-NFPA 99-2015
Statement: The redundant material in items 5 and 9 was removed and clarified.

The concept of parental education was expanded to include parents rights to challenge individuals.

Public Input No. 69-NFPA 99-2015 [Section No. 13.5.3]

13.5.3

Pediatric and infant care areas shall have a security plan for the prevention of, and response to, pediatric and infant abduction that shall include appropriate protections, such as the following:

(1) Control and limitation of access by the general public

(2) Screening by nursing prior to allowing persons access to infant care areas

(3) Matching protocol with staff clearance to pair infants with parents

(4) System to monitor and track the location of pediatric and infant patients

(5) * Facility alert system, lockdown, and staff inspection of all packages leaving the premises

(6) Use of electronic monitoring, tracking, and access control equipment

(7) Use of an automated and standardized facility-wide alerting system to announce pediatric or infant abduction

(8) Remote exit locking or alarming

(9) Facility lockdown procedures and staff inspection of all persons and packages leaving the premises

(10) Prohibition on birth announcements by staff

(11) Detection of the presence of nonidentified individual constitutes security breach

(12) Movement of infants restricted to basinets only — no hand carries

(13) Health care staff wear unique identification or uniforms

(14) Secure storage of scrubs and uniforms, both clean and dirty

(15) Education in pediatric and infant abduction as follows:

(16) Health care staff are familiar with infant abduction scenarios.

(17) Parents know not to leave a child or an infant unattended or in the care of an unidentified person.

(18) Visiting family and friends not permitted to enter any nursery area with an infant or a newborn from the outside

(19) Infant abduction drills conducted periodically to test effectiveness of chosen measures

(20) Identification signs for infant parents to challenge anyone before releasing an infant from custody of parents.

Statement of Problem and Substantiation for Public Input

Infant security needs to be changed at the parent level. By installing signs that will alert all parents to challenge anyone (staff, visitors, or doctors) it will eliminate the opportunity for infant abduction.

Submitter Information Verification

Submitter Full Name: KENNETH GIBSON
Organization: SODEXHO HEALTHCARE
Street Address:
City:
State:
Zip:
Submittal Date: Sun Apr 19 02:50:14 EDT 2015

Committee Statement

Resolution: FR-211-NFPA 99-2015
Statement: The redundant material in items 5 and 9 was removed and clarified.

The concept of parental education was expanded to include parents rights to challenge individuals.

Public Input No. 215-NFPA 99-2015 [Section No. 13.9.1]

13.9.1

The security management plan shall provide procedures for ~~crowd~~ control of crowds demanding access to a health care facility.

Statement of Problem and Substantiation for Public Input

Editorial. This section is confusing as written.

Submitter Information Verification

Submitter Full Name: SUSAN MCLAUGHLIN
Organization: MSL HEALTHCARE PARTNERS, INC
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jun 21 17:38:49 EDT 2015

Committee Statement

Resolution: FR-217-NFPA 99-2015
Statement: The title was revised to more accurately reflect the content of the section.

Section 13.9.1 was deleted because it was redundant to Section 13.8.1.

Section 13.9.2 was moved to a more appropriate location, since it deals with policies and procedures and not equipment.

Sections 13.9.2.1 through 13.9.3 were renumbered.

Public Input No. 70-NFPA 99-2015 [Section No. 13.10]

13.10 * Employment Practices.

Employers shall ensure a high level of integrity in the workplace by using the following practices:

(1) Background checks of employees with access to critical assets

(2) Background checks of outside contractors' employees

(3) Outside contractors employees will attend site orientation prior to allowing access including: Infection control procedures, Site policies and procedures, Hazardous materials and waste, trash removal, Lock out / Tag out, Emergency procedures, HIPPA regulations, TB testing and innoculations required for site access.

(4) Drug testing program for employees

Statement of Problem and Substantiation for Public Input

Site orientation for outside contractors will curtail issues from infection control, patient safety, disposal, and disease spread. There are too many times where contractors are allowed on site due to need without knowledge of healthcare and the dangers associated with healthcare surroundings. Requiring an orientation will mandate all organizations to follow simple rules to ensure contractors have the knowledge before performing work at a facility.

Submitter Information Verification

Submitter Full Name: KENNETH GIBSON
Organization: SODEXHO HEALTHCARE
Street Address:
City:
State:
Zip:
Submittal Date: Sun Apr 19 03:05:30 EDT 2015

Committee Statement

Resolution: The proposed revisions are outside the scope of the chapter. These are training issues rather than security issues.

Public Input No. 459-NFPA 99-2015 [Chapter 14]

Chapter 14 Hyperbaric Facilities

14.1* Scope.

The scope of this chapter shall be as specified in 1.1.12.

14.1.1 Applicability.

14.1.1.1

This chapter shall apply to new facilities.

14.1.1.2

The following sections of this chaptershall apply to both new and existing facilities:

(1) 14.2.4.1.1 (excluding subsections)
(2) 14.2.4.1.1.1
(3) 14.2.4.1.2
(4) 14.2.4.1.3 (excluding subsections)
(5) 14.2.4.1.3.3
(6) 14.2.4.3.3 (and subsections)
(7) 14.2.4.4 (and subsections)
(8) 14.2.4.5.3
(9) 14.2.4.5.4 (and subsection)
(10) 14.2.5.1.4 (excluding subsection)
(11) 14.2.5.1.5
(12) 14.2.5.1.7
(13) 14.2.5.5 (and subsection)
(14) 14.2.7.1
(15) 14.2.7.2 (and subsection)
(16) 14.2.8.3 through 14.2.8.3.5
(17) 14.2.8.3.9 (and subsection)
(18) 14.2.8.3.15.4
(19) 14.2.8.3.16.5
(20) 14.2.8.3.17 (and subsections)
(21) 14.2.8.4.1.3
(22) 14.2.8.6 (and subsections)
(23) 14.2.9.3 through 14.2.9.8 (and subsections)
(24) 14.2.10.2.5
(25) 14.3.1 (and subsections)
(26) 14.3.2.1.1 through 14.3.2.1.8
(27) 14.3.2.4 through 14.3.2.6 (and subsection)
(28) 14.3.3 through 14.3.6 (and subsections)

14.1.1.3

This chapter shall also apply to the altered, renovated, or modernized portion of an existing system or individual component.

14.1.1.4

Existing construction or equipment shall be permitted to be continued in use when such use does not constitute a distinct hazard to life.

14.1.2 Classification of Chambers.

14.1.2.1 General.

Chambers shall be classified according to occupancy in order to establish appropriate minimum essentials in construction and operation.

14.1.2.2* Occupancy.

Hyperbaric chambers shall be classified according to the following criteria:

(1) Class A — Human, multiple occupancy

(2) Class B — Human, single occupancy

(3) Class C — Animal, no human occupancy

14.1.3 Category of Care.

14.1.3.1 Category 1 Care.

Where interruption or failure of medical gas supply is likely to cause major injury or death of patients, staff, or visitors, the level of care shall be considered Category 1 in the requirements for medical gas systems in hyperbaric facilities.

14.1.3.2 Category 2 Care.

Where interruption or failure of medical gas supply is likely to cause minor injury of patients, staff, or visitors, the level of care shall be considered Category 2 in the requirements for medical gas systems in hyperbaric facilities.

14.1.3.3 Category 3 Care.

Where interruption or failure of medical gas supply is not likely to cause injury to patients, staff, or visitors, the level of care shall be considered Category 3 in the requirements for medical gas systems in hyperbaric facilities.

14.1.3.4 Category 4 Care. (Reserved)

14.2 Construction and Equipment.

14.2.1 Housing for Hyperbaric Facilities.

14.2.1.1

For Class A chambers located inside a building, the chamber(s) and all ancillary service equipment shall be protected by 2-hour fire-resistant-rated construction.

14.2.1.1.1*

Freestanding, dedicated buildings containing only a Class A chamber(s) and ancillary service equipment shall not be required to be protected by 2-hour fire-resistant-rated construction.

14.2.1.1.2

Class B and C chambers located inside a building shall not be required to be protected by 2-hour fire-resistant-rated construction.

14.2.1.1.3

Trailer or vehicle-mounted facilities shall be permitted without a 2-hour fire-resistant-rated perimeter.

14.2.1.1.4

When trailer or vehicle-mounted facilities are located contiguous to a health care facility or another structure, a 2-hour fire-resistant-rated barrier shall be placed between the facility and the contiguous structure.

14.2.1.1.5

Where building exterior walls form part of the facility boundary, that portion of the facility boundary shall not require 2-hour fire-resistant-rated construction.

14.2.1.1.6*

If there are connecting doors through such common walls of contiguity, they shall be at least B-label, 1 ½ -hour fire doors.

14.2.1.1.7

When used for hyperbaric procedures, the room or rooms housing the Class A or Class B chambers shall be for the exclusive use of the hyperbaric operation.

14.2.1.1.8

Service equipment (e.g., compressors) shall be permitted to be located in multi-use spaces meeting the requirements of 14.2.1.1.

14.2.1.1.9

The supporting foundation for any chamber shall be designed to support the chamber.

14.2.1.1.9.1

If on-site hydrostatic testing will be performed, the chamber supporting foundation shall be designed to support an additional water weight.

14.2.1.2*

A hydraulically calculated automatic wet pipe sprinkler system meeting the requirements of NFPA 13, *Standard for the Installation of Sprinkler Systems*, or an automatic water mist fire protection system installed in accordance with NFPA 750, *Standard on Water Mist Fire Protection Systems*, shall be installed in the room housing a Class A, Class B, or Class C chamber and in any ancillary equipment rooms.

14.2.1.2.1

Class A, Class B, or Class C chambers not contiguous to a health care facility and located in a mobile vehicle-mounted facility shall not be required to be protected as specified in 14.2.1.2.

14.2.1.3 Hyperbaric Piping Requirements.

14.2.1.3.1*

Except where otherwise required by this chapter, piping systems dedicated to the hyperbaric chamber shall meet the requirements of ANSI/ASME PVHO-1, *Safety Standard for Pressure Vessels for Human Occupancy*, for hyperbaric facility piping systems.

14.2.1.3.2

Shutoff valves accessible to facility personnel shall be provided for piping specified in 14.2.1.3.1 at the point of entry to the room housing the chamber(s).

14.2.1.4 Hyperbaric Medical Oxygen System Requirements.

14.2.1.4.1

Where medical oxygen systems are installed for hyperbaric use, the hyperbaric area(s) or facility shall be treated as a separate zone.

14.2.1.4.2

The requirements of Chapter 5 shall apply to the medical oxygen system for hyperbaric use, from the source of supply to the first in-line valve located downstream of the zone valve(s).

14.2.1.4.3

The requirements of ANSI/ASME PVHO-1, *Safety Standard for Pressure Vessels for Human Occupancy*, shall apply to the medical oxygen system for hyperbaric use, starting immediately downstream of the first in-line valve located after the zone valve(s).

14.2.1.4.4 General.

Where an oxygen system is installed for hyperbaric treatments, it shall comply with the requirements for the appropriate level as determined in 14.2.1.4.4.2 through 14.2.1.4.4.7.

14.2.1.4.4.1

Hyperbaric oxygen systems for Category 1, Category 2, and Category 3 care connected directly to a hospital's oxygen system shall comply with Section 5.1, as applicable, except as noted in 14.2.1.4.4.2.

14.2.1.4.4.2 Central Supply Systems.

Oxygen systems shall comply with 5.1.3.5, as applicable, except as follows:

(1) An emergency oxygen supply connection (EOSC) is not required for the hyperbaric oxygen system.

(2) An in-building emergency reserve (IBER) is not required for the hyperbaric oxygen system.

14.2.1.4.4.3

Hyperbaric stand-alone oxygen systems for Category 1 and Category 2 care shall comply with Section 5.1, as applicable, except as noted in 14.2.1.4.4.4.

14.2.1.4.4.4 Central Supply Systems.

Oxygen systems shall comply with 5.1.3.5, as applicable, except as follows:

(1) An EOSC is not required for the hyperbaric oxygen system.

(2) An IBER is not required for the hyperbaric oxygen system.

14.2.1.4.4.5 Warning Systems.

(A)

Oxygen systems shall comply with 5.1.9, as applicable, except that warning systems shall be permitted to be a single master/area alarm panel.

(B)

The alarm panel shall be located in the room housing the chamber(s) to allow for easy audio and visual monitoring by the chamber operator

14.2.1.4.4.6

Hyperbaric stand-alone oxygen systems for Category 3 care shall comply with Section 5.2, as applicable, except as noted in 14.2.1.4.4.7.

14.2.1.4.4.7 Central Supply Systems.

Oxygen systems shall comply with 5.1.3.5, as applicable, except as follows:

(1) If the operating oxygen supply consists of high pressure cylinders designed with a primary and secondary source, no reserve supply is required.

(2) If the operating oxygen supply consists of liquid containers designed with a primary and secondary source, a reserve with a minimum supply of 15 minutes is required.

(3) If the operating oxygen supply consists of a bulk primary, a reserve with a minimum supply of 15 minutes is required.

(4) An EOSC is not required for the hyperbaric oxygen system.

(5) An IBER is not required for the hyperbaric oxygen system.

14.2.1.5 Storage and Handling of Medical Gases.

Storage and handling of medical gases shall meet the applicable requirements of Chapter 5.

14.2.1.6 Hyperbaric Medical Air System Requirements.

14.2.1.6.1

Where medical air systems are installed for hyperbaric use, the hyperbaric area(s) or facility shall be treated as a separate zone.

14.2.1.6.2

Chapter 5 requirements shall apply to the medical air system for hyperbaric use, from the source of supply to the first in-line valve located downstream of the zone valve(s).

14.2.1.6.3

ANSI/ASME PVHO-1, *Safety Standard for Pressure Vessels for Human Occupancy*, requirements shall apply to the medical air system for hyperbaric use, starting immediately downstream of the first in-line valve located after the zone valve(s).

14.2.1.6.4

Where a medical air system is installed for hyperbaric treatments, it shall comply with the requirements for the appropriate level as determined in 14.2.1.6.4.1 through 14.2.1.6.4.7.

14.2.1.6.4.1

Hyperbaric medical air systems for Category 1, Category 2, and Category 3 care connected directly to a hospital's medical air system shall comply with Section 5.2, as applicable.

14.2.1.6.4.2 Reserved.

14.2.1.6.4.3

Hyperbaric stand-alone medical air systems for Category 1 and Category 2 care shall comply with Section 5.2, as applicable.

14.2.1.6.4.4 Reserved.

14.2.1.6.4.5

Medical air systems for Category 1 and Category 2 care shall comply with Section 5.2, as applicable, except that warning systems shall be permitted to be a single master/area alarm panel.

14.2.1.6.4.6

Hyperbaric stand-alone medical systems for Category 3 care shall comply with Section 5.2, as applicable, except as noted in 14.2.1.6.4.7.

14.2.1.6.4.7

Medical air systems shall comply with Section 5.2 as applicable, except as follows:

(1) Area and master alarms are not required for Category 3 care.

(2) A gas cylinder header per Section 5.2 with sufficient cylinder connections to provide for at least an average day's supply with the appropriate number of connections being determined after consideration of delivery schedule, proximity of the facility to alternate supplies, and the facility's emergency plan is permitted.

14.2.2 Fabrication of the Hyperbaric Chamber.

14.2.2.1*

Chambers for human occupancy and their supporting systems shall be designed and fabricated to meet ANSI/ASME PVHO-1, *Safety Standard for Pressure Vessels for Human Occupancy*, by personnel qualified to fabricate vessels under such codes.

14.2.2.1.1

Piping systems for hyperbaric facilities shall be required to meet only the requirements of this chapter and section “Piping” of ANSI/ASME PVHO-1, *Safety Standard for Pressure Vessels for Human Occupancy*.

14.2.2.1.2

Piping that is installed in concealed locations in the building housing the hyperbaric facility, such as inside building walls or above false ceilings, shall use only those joining procedures permitted by Chapter 5.

14.2.2.2

The chamber shall be stamped in accordance with ANSI/ASME PVHO-1, *Safety Standard for Pressure Vessels for Human Occupancy*.

14.2.2.3

As a minimum, animal chambers shall be designed, fabricated, and stamped to meet ASME *Boiler and Pressure Vessel Code* Section VIII, Division 1 code requirements.

14.2.2.4

The floor of a Class A chamber shall be designed to support equipment and personnel necessary for the operation of the chamber according to its expected purpose.

14.2.2.4.1

The floor of Class A chambers shall be noncombustible.

14.2.2.4.2

If a bilge is installed, access to the bilge shall be provided for cleaning purposes.

14.2.2.4.3

If the interior floor of a Class A chamber consists of removable floor (deck) plates, the plates shall be mechanically secured and electrically bonded to the chamber to ensure a positive electrical ground and to prevent movement of the plate, which could cause injury to personnel.

14.2.2.5*

The interior surface of Class A chambers shall be unfinished or treated with a paint/coating in accordance with 14.2.2.5.1.

14.2.2.5.1*

Interior paint/coating shall meet the performance criteria of NFPA *101*, *Life Safety Code*, Class A interior finish, when tested in accordance with ASTM E 84, *Standard Test Method for Surface Burning Characteristics of Building Materials*, or ANSI/UL 723, *Standard for Test for Surface Burning Characteristics of Building Materials*.

14.2.2.5.2

One additional application of paint shall be permitted, provided total paint thickness does not exceed 1⁄28 in. (0.9 mm).

14.2.2.5.3

If the interior of a Class A chamber is treated (painted) with a finish described in 14.2.2.5, the cure procedure and minimum duration for each layer of paint/coating to off-gas shall be in accordance with the manufacturer's application instructions.

14.2.2.5.4*

If sound-deadening materials are employed within a hyperbaric chamber, they shall be limited-combustible materials.

14.2.2.6*

Viewing ports, access ports for piping and wiring or monitoring, and related leads shall be installed during initial fabrication of the chamber.

14.2.2.6.1

Access ports in Class A chambers, access ports for monitoring, and other electrical circuits shall be housed in enclosures that are weatherproof, both inside and outside the chamber, for protection in the event of sprinkler activation.

14.2.2.6.2

Viewports and penetrator plates shall be designed and fabricated according to ANSI/ASME PVHO-1, *Safety Standard for Pressure Vessels for Human Occupancy.*

14.2.3 Illumination.

14.2.3.1

Unless designed for chamber use, sources of illumination shall be mounted outside the pressure chamber and arranged to shine through chamber ports or through chamber penetrators designed for fiber-optic or similar lighting.

14.2.3.1.1

Lighting fixtures used in conjunction with viewports shall be designed so that temperature ratings for the viewport material given in ANSI/ASME PVHO-1 are not exceeded.

14.2.3.1.2

Gasket material shall be of a type that allows the movement of thermal expansion and shall be selected for the temperatures, pressures, and composition of gases involved.

14.2.3.1.2.1

Gaskets or O-rings shall be confined to grooves or enclosures, which will prevent their being blown out or squeezed from the enclosures or compression flanges.

14.2.3.2

Lighting permanently installed inside the chamber and portable lighting for temporary use inside the chamber shall meet the requirements of 14.2.8.3.15.

14.2.3.3

Emergency lighting for the interior of the chamber shall be provided.

14.2.4 Chamber Ventilation.

14.2.4.1 Ventilation of Class A Chambers.

14.2.4.1.1

The minimum ventilation rate for a Class A chamber shall be 0.085 m^3/min (3 ft^3/min) of air per chamber occupant who is not using a breathing-mask overboard dump system that exhausts exhaled gases.

14.2.4.1.1.1

The minimum threshold rate shall be 0.085 m^3/min (3 ft^3/min).

14.2.4.1.1.2

Provision shall be made for ventilation during nonpressurization of Class A chambers as well as during pressurization.

14.2.4.1.2*

Ventilation shall not be required when saturation operations are conducted in the chamber, provided that carbon dioxide removal and odor control are accomplished and that the monitoring requirements of 14.2.9.4.1 and 14.2.9.5 are met.

14.2.4.1.3

Individual breathing apparatus shall be available inside a Class A chamber for each occupant for use in the event that the chamber atmosphere is fouled by combustion or otherwise.

14.2.4.1.3.1

The breathing mixture supplied to breathing apparatus shall be independent of chamber atmosphere.

14.2.4.1.3.2

The breathing gas supply shall be designed for simultaneous use of all breathing apparatus.

14.2.4.1.3.3

Breathing apparatus shall function at all pressures that can be encountered in the chamber.

14.2.4.1.3.4

In the event of a fire within a chamber, provision shall be made to simultaneously switch all breathing apparatus to an air supply that is independent of the chamber atmosphere.

14.2.4.2 Sources of Air for Chamber Atmospheres.

14.2.4.2.1*

Sources of air for chamber atmospheres shall be such that toxic or flammable gases are not introduced.

14.2.4.2.2

Compressor intakes shall be located away from air contaminated by exhaust from activities of vehicles, internal combustion engines, stationary engines, or building exhaust outlets.

14.2.4.2.3

Air supply for chamber atmosphere shall be monitored as required in 14.2.9.6.

14.2.4.2.4

The use of conventional oil-lubricated compressors shall be permitted, provided that they are fitted with air treatment packages designed to meet the requirements of 14.2.9.6.

14.2.4.2.4.1

The air treatment packages shall include automatic safeguards.

14.2.4.2.5

Air compressor installations shall consist of two or more individual compressors with capacities such that required system flow rates can be maintained on a continuous basis with any single compressor out of operation, unless 14.2.8.2.5 is satisfied.

14.2.4.2.5.1

Each compressor shall be supplied from separate electrical branch circuits.

14.2.4.2.6

Air compressor installations that supply medical air to piped gas systems as well as to hyperbaric facilities shall meet the requirements of 5.1.3.6.3 and this chapter.

14.2.4.2.7

Air compressor installations that are used exclusively for hyperbaric facilities shall meet the requirements of this chapter only.

14.2.4.3 Temperature and Humidity Control.

14.2.4.3.1

Warming or cooling of the atmosphere within a Class A chamber shall be permitted by circulating the ambient air within the chamber over or past coils through which a constant flow of warm or cool water or water/glycol mixture is circulated.

14.2.4.3.2*

Class A chambers that are not used in the capacity of an operating room shall maintain a temperature that is comfortable for the occupants [usually 22°C ±2°C (75°F ±5°F)].

14.2.4.3.3

Whenever the Class A chamber is used as an operating room, it shall be ventilated, and the atmosphere shall be conditioned according to the minimum requirements for temperature in hospital operating rooms.

14.2.4.3.3.1

If inhalation anesthetic agents are being utilized (e.g., halothane, isoflurane, sevoflurane, desflurane), a closed anesthetic system with exhaled gas scavenging and overboard dumping shall be employed.

14.2.4.3.3.2

Flammable inhalation anesthetics (e.g., cyclopropane, ethyl ether, ethylene, and ethyl chloride) shall not be employed.

14.2.4.3.4

Dehumidification shall be permitted through the use of cold coils.

14.2.4.3.5

Humidification by the use of an air-powered water nebulizer shall be permitted.

14.2.4.3.6

Noncombustible packing and nonflammable lubricant shall be employed on the fan shaft.

14.2.4.4 Ventilation of Class B Chambers.

14.2.4.4.1*

The minimum ventilation rate for a Class B chamber shall be 0.0283 m^3/min (1 ft^3/min).

14.2.4.4.2

Class B chambers not designed for 100 percent oxygen environment shall comply with the monitoring requirements of 14.2.9.4.

14.2.4.4.3

For Class B chambers equipped with a breathing apparatus, the breathing apparatus shall function at all pressures that can be encountered in the chamber.

14.2.4.5 Emergency Depressurization and Facility Evacuation Capability.

14.2.4.5.1

Class A chambers shall be capable of depressurizing from 3 ATA (304.0 kPa) to ambient pressure in not more than 6 minutes.

14.2.4.5.2

Class B chambers shall be capable of depressurizing from 3 ATA (304.0 kPa) to ambient pressure in not more than 2 minutes.

14.2.4.5.3*

A means for respiratory and eye protection from combustion products allowing unrestricted mobility shall be available outside a Class A or Class B chamber for use by personnel in the event the air in the vicinity of the chamber is fouled by smoke or other combustion products.

14.2.4.5.4

The time required to evacuate all persons from a hyperbaric area with a full complement of chamber occupants all at treatment pressure shall be measured annually during the fire training drill required by 14.3.1.4.5.

14.2.4.5.4.1

The occupants for this training drill shall be permitted to be simulated.

14.2.5 Fire Protection in Class A Chambers.

14.2.5.1 General.

14.2.5.1.1

A fire suppression system consisting of independently supplied and operating handline- and deluge-type water spray systems shall be installed in all Class A chambers.

14.2.5.1.2

Design of the fire suppression system shall be such that failure of components in either the handline or deluge system will not render the other system inoperative.

14.2.5.1.3

System design shall be such that activation of either the handline or the deluge system shall automatically cause the following:

(1) Visual and aural indication of activation shall occur at the chamber operator's console.

(2) All ungrounded electrical leads for power and lighting circuits contained inside the chamber shall be disconnected.

(3) Emergency lighting *(see 14.2.3.3)* and communication, where used, shall be activated.

14.2.5.1.3.1

Intrinsically safe circuits, including sound-powered communications, shall be permitted to remain connected when either the handline or the deluge system is activated.

14.2.5.1.4*

A fire alarm signaling device shall be provided at the chamber operator's control console for signaling the emergency fire/rescue network of the institution containing the hyperbaric facility.

14.2.5.1.4.1

Trailer or vehicle-mounted facilities not contiguous to a health care facility shall conform to one of the following:

(1) They shall comply with 14.2.5.1.4.

(2) They shall have a means for immediately contacting the local fire department.

14.2.5.1.5*

Fire blankets and portable carbon dioxide extinguishers shall not be installed in or carried into the chamber.

14.2.5.1.6

Booster pumps, control circuitry, and other electrical equipment involved in fire suppression system operation shall be powered from a critical branch of the essential electrical system as specified in 14.2.8.2.2.2.

14.2.5.1.7

Signs prohibiting the introduction of flammable liquids, gases, and other articles not permitted by this chapter into the chamber shall be posted at the chamber entrance(s).

14.2.5.1.8

The fire suppression system shall be permitted to be supplied from the local potable water service.

14.2.5.2 Deluge System.

A fixed water deluge extinguishing system shall be installed in all chamber compartments that are designed for manned operations.

14.2.5.2.1

In chambers that consist of more than one chamber compartment (lock), the design of the deluge system shall meet the requirements of 14.2.5.2 when the chamber compartments are at different depths (pressures).

14.2.5.2.2

The deluge system in different compartments (locks) shall operate independently or simultaneously.

14.2.5.2.3

Fixed deluge systems shall not be required in chamber compartments that are used strictly as personnel transfer compartments (locks) and for no other purposes.

14.2.5.2.4*

Manual activation and deactivation deluge controls shall be located at the operator's console and in each chamber compartment (lock) containing a deluge system.

14.2.5.2.4.1

Controls shall be designed to prevent unintended activation.

14.2.5.2.5

Water shall be delivered from the fixed discharge nozzles as specified in 14.2.5.2.7 within 3 seconds of activation of any affiliated deluge control.

14.2.5.2.6*

Average spray density at floor level shall be not less than 81.5 L/min/m^2 (2 gpm/ft^2), with no floor area larger than 1 m^2 (10.76 ft^2) receiving less than 40.75 L/min/m^2 (1 gpm/ft^2).

14.2.5.2.7

Water shall be available in the deluge system to maintain the flow specified in 14.2.5.2.6 simultaneously in each chamber compartment (lock) containing the deluge system for 1 minute.

14.2.5.2.7.1

The limit on maximum extinguishment duration shall be governed by the chamber capacity (bilge capacity also, if so equipped) or its drainage system, or both.

14.2.5.2.8

The deluge system shall have stored pressure to operate for at least 15 seconds without electrical branch power.

14.2.5.3 Handline System.

A handline extinguishing system shall be installed in all chamber compartments (locks).

14.2.5.3.1

At least two handlines shall be strategically located in treatment compartments (locks).

14.2.5.3.2

At least one handline shall be located in each personnel transfer compartment (lock).

14.2.5.3.3

If any chamber compartment (lock) is equipped with a bilge access panel, at least one handline shall reach the bilge area.

14.2.5.3.4

Handlines shall have a 12.7 mm (0.5 in.) minimum internal diameter and shall have a rated operating pressure greater than the highest supply pressure of the supply system.

14.2.5.3.5

Each handline shall be activated by a manual, quick-opening, quarter-turn valve located within the compartment (lock).

14.2.5.3.5.1

A hand-operated spring-return to close valves at the discharge end of handlines shall be permitted.

14.2.5.3.6

Handlines shall be equipped with override valves that are accessible to personnel outside the chamber.

14.2.5.3.7

The water supply for the handline system shall be designed to ensure a 345 kPa (50 psi) minimum water pressure above the maximum chamber pressure.

14.2.5.3.7.1

The system shall be capable of supplying a minimum of 18.9 L/min (5 gpm) simultaneously to each of any two of the handlines at the maximum chamber pressure for a period of not less than 4 minutes.

14.2.5.4 Automatic Detection System.

Automatic fire detection systems shall not be required.

14.2.5.4.1

Surveillance fire detectors responsive to the radiation from flame shall be employed.

14.2.5.4.1.1

The type and arrangement of detectors shall be such as to respond within 1 second of flame origination.

14.2.5.4.2*

The number of detectors employed and their location shall be selected to cover the chamber interior.

14.2.5.4.3

The system shall be powered from the critical branch of the essential electrical system or shall have automatic battery backup.

14.2.5.4.4

If used to automatically activate the deluge system, the requirements for manual activation/deactivation in 14.2.5.2.4 and deluge system response time in 14.2.5.2.5 shall still apply.

14.2.5.4.5

The system shall include self-monitoring functions for fault detection and fault alarms and indications.

14.2.5.4.6

Automatic fire detection equipment, when used, shall meet the applicable requirements in 14.2.8.3.

14.2.5.5* Testing.

The deluge and handline systems shall be functionally tested at least semiannually per 14.2.5.2.7 for deluge systems and 14.2.5.3.7 for handline systems.

14.2.5.5.1

Following the test, all valves shall be placed in their baseline position.

14.2.5.5.2

If a bypass system is used, it shall not remain in the test mode after completion of the test.

14.2.5.5.3

During initial construction, or whenever changes are made to the installed deluge system that will affect the spray pattern, testing of spray coverage to demonstrate conformance to the requirements of 14.2.5.2.6 shall be performed at surface pressure and at maximum operating pressure.

14.2.5.5.3.1

The requirements of 14.2.5.2.6 shall be satisfied under both surface pressure and maximum operating pressure.

14.2.5.5.4

A detailed record of the test results shall be maintained and a copy sent to the hyperbaric facility safety director.

14.2.5.5.5

Inspection, testing, and maintenance of hyperbaric fire suppression systems shall be performed by a qualified person.

14.2.6 Pneumatic Controls for Class A Chambers.

Class A chambers that utilize pneumatically operated controls that are related to fire suppression system operation, breathing gases, or rapid exhaust valves shall be equipped with a means to operate such controls or intended function in the event that the pneumatic supply fails.

14.2.7 Fire Protection in Class B and Class C Chambers.

Class B and Class C chambers shall not be required to comply with 14.2.5.

14.2.7.1

Signs prohibiting the introduction of flammable liquids, gases, and other articles not permitted by this chapter into the chamber shall be posted at the chamber entrance(s).

14.2.7.2

A fire alarm signaling device shall be provided within the room housing the chamber(s) for signaling the emergency fire/rescue network of the institution containing the hyperbaric facility.

14.2.7.2.1

Trailer or vehicle-mounted facilities not contiguous to a health care facility shall conform to one of the following:

(1) They shall comply with 14.2.7.2.

(2) They shall have a means for immediately contacting the local fire department.

14.2.8 Electrical Systems.

14.2.8.1 General.

14.2.8.1.1

The requirements of *NFPA 70*, *National Electrical Code*, or local electrical codes shall apply to electrical wiring and equipment in hyperbaric facilities within the scope of this chapter, except as such rules are modified in 14.2.8.

14.2.8.1.2

All hyperbaric chamber service equipment, switchboards, panels, or control consoles shall be located outside of, and in the vicinity of, the chamber.

14.2.8.1.3

Console or module spaces containing both oxygen piping and electrical equipment shall be either one of the following:

(1) Mechanically or naturally ventilated

(2) Continuously monitored for excessive oxygen concentrations whenever the electrical equipment is energized

14.2.8.1.4

For the fixed electrical installation, none of the following shall be permitted inside the chamber:

(1) Circuit breakers

(2) Line fuses

(3) Motor controllers

(4) Relays

(5) Transformers

(6) Ballasts

(7) Lighting panels

(8) Power panels

14.2.8.1.4.1*

If motors are to be located in the chamber, they shall meet the requirements of 14.2.8.3.14.

14.2.8.1.5

All electrical equipment connected to, or used in conjunction with, hyperbaric patients shall comply with the requirements of Chapter 10 and with the applicable subparagraphs of 14.2.8.3.

14.2.8.1.6

In the event of activation of the room sprinkler system, electrical equipment shall be protected from sprinkler water but shall not be required to remain functional if manual means to control and decompress the chamber are provided.

14.2.8.2 Electrical Service.

14.2.8.2.1

All hyperbaric facilities shall contain an electrical service that is supplied from two independent sources of electric power.

14.2.8.2.1.1

All hyperbaric facilities for human occupancies shall contain an electrical service that is supplied from two independent sources of electric power.

14.2.8.2.1.2

For hyperbaric facilities using a prime-mover-driven generator set, it shall be designated as the life safety and critical branches and shall meet the requirements of Chapter 6 for hyperbaric systems based in health care facilities.

14.2.8.2.1.3

Article 700 of *NFPA 70*, *National Electrical Code*, shall apply to hyperbaric systems located in facilities other than health care facilities.

14.2.8.2.2

Electrical equipment associated with life-support functions of hyperbaric facilities shall be connected to the critical branch of the life safety and critical branches, which requires that such equipment shall have electrical power restored within 10 seconds of interruption of normal power.

14.2.8.2.2.1

The equipment specified in 14.2.8.2.2 shall include, but is not limited to, the following:

(1) Electrical power outlets located within the chamber

(2) Chamber emergency lighting, whether internally or externally mounted

(3) Chamber intercommunications

(4) Alarm systems, including fire detectors

(5) Chamber fire suppression system equipment and controls

(6) Other electrical controls used for chamber pressurization and ventilation control

(7) A sufficient number of chamber room lights (either overhead or local) to ensure continued safe operation of the facility during a normal power outage

14.2.8.2.2.2

Booster pumps in the chamber fire suppression system shall be on separate branch circuits serving no other loads.

14.2.8.2.3

Electric motor–driven compressors and auxiliary electrical equipment normally located outside the chamber and used for chamber atmospheric control shall be connected to the equipment system *(see Chapter 6)* or the life safety and critical branches *(see NFPA 70*, *National Electrical Code , Article 700)*, as applicable.

14.2.8.2.4

Electric motor–driven compressors and auxiliary electrical equipment shall be arranged for delayed-automatic or manual connection to the alternate power source so as to prevent excessive current draw on the system during restarting.

14.2.8.2.5

When reserve air tanks or a nonelectric compressor(s) is provided to maintain ventilation airflow within the chamber and supply air for chamber pressurization, the compressor(s) and auxiliary equipment shall not be required to have an alternate source of power.

14.2.8.2.6

Electrical control and alarm system design shall be such that hazardous conditions (e.g., loss of chamber pressure control, deluge activation, spurious alarms) do not occur during power interruption or during power restoration.

14.2.8.3* Wiring and Equipment Inside Class A Chambers.

The general rules of 14.2.8.3.1 through 14.2.8.3.17.6 shall be satisfied in the use of electrical devices and equipment. These requirements are intended to protect against the elevated fire risks known to exist in a pressurized air environment and shall not be construed as classifying the chamber interior as a Class I (as defined in *NFPA 70*, *National Electrical Code*, Article 500) hazardous location.

14.2.8.3.1

Equipment or equipment components installed in, or used in, the chamber shall not present an explosion or implosion hazard under the conditions of hyperbaric use.

14.2.8.3.2

All equipment shall be rated, or tested and documented, for intended hyperbaric conditions prior to use.

14.2.8.3.3

Only the electrical equipment necessary for the safe operation of the chamber and for required patient care shall be permitted in the chamber.

14.2.8.3.4

Only portable equipment necessary for the logistical and operational support shall be permitted in the chamber during manned pressurization.

14.2.8.3.5

Where conformance with Class I, Division 1 requirements is specified in 14.2.8.3.7, conformance with Class I, Division 2 requirements shall be permitted to be substituted.

14.2.8.3.6 Wires and Cables.

Wires and cables used inside the chamber shall be resistant to the spread of fire by complying with 14.2.8.3.6.1 or shall be contained within equipment described in 14.2.8.3.6.2.

14.2.8.3.6.1

Wires and cables shall comply with the spread of fire requirements of “UL Flame Exposure, Vertical Tray Flame Test” in UL 1685, *Standard for Vertical-Tray Fire-Propagation and Smoke-Release Test for Electrical and Optical-Fiber Cables*, or shall exhibit damage (char length) not to exceed 1.5 m (4 ft 11 in.) when performing the CSA “Vertical Flame Test — Cables in Cable Trays,” as described in CSA C22.2 No. 0.3-M, *Test Methods for Electrical Wires and Cables*.

14.2.8.3.6.2

Wires and cables that form an integral part of electrical equipment approved or listed specifically for use inside hyperbaric chambers, including patient leads, shall not be required to comply with the requirements of 14.2.8.3.6.1.

14.2.8.3.7 Wiring Methods.

14.2.8.3.7.1

Fixed wiring shall be installed in threaded RMC or IMC conduit utilizing the following waterproof components:

(1) Threaded metal joints

(2) Fittings

(3) Boxes

(4) Enclosures

14.2.8.3.7.2

A continuous ground shall be maintained between all conductive surfaces enclosing electrical circuits and the chamber hull using approved grounding means.

14.2.8.3.7.3

All threaded conduit shall be threaded with an NPT standard conduit cutting die that provides a 19 mm taper per 0.3 m (0.75 in. taper per 1 ft).

14.2.8.3.7.4

All threaded conduit shall be made wrench-tight to prevent sparking when fault current flows through the conduit system.

14.2.8.3.7.5

Wiring classified as intrinsically safe for any group location and installed in accordance with Article 504 of *NFPA 70*, *National Electrical Code*, shall be permitted.

14.2.8.3.7.6

Threaded, liquidtight flexible metal conduit installed in accordance with Article 350 of *NFPA 70*, *National Electrical Code*, shall be permitted when protected from damage by physical barriers such as equipment panels.

14.2.8.3.8 Drainage.

Means of draining fixed conduit and fixed equipment enclosures shall be provided.

14.2.8.3.9 Flexible Electrical Cords.

Flexible cords used to connect portable utilization equipment to the fixed electrical supply circuit shall meet all of the following requirements:

(1) They shall be of a type approved for extra-hard utilization in accordance with Table 400.4 of *NFPA 70*, *National Electrical Code*.

(2) They shall include a ground conductor.

(3) They shall meet the requirements of 501.140 of *NFPA 70*, *National Electrical Code*.

14.2.8.3.9.1

The normal cord supplied with the portable utilization equipment shall be permitted when the portable device is rated at less than 2 A and the cord is positioned out of traffic and protected from physical abuse.

14.2.8.3.10* Receptacles Installed Inside the Chamber.

14.2.8.3.10.1

Receptacles shall be waterproof.

14.2.8.3.10.2

Receptacles shall be of the type providing for connection to the grounding conductor of the flexible cord.

14.2.8.3.10.3

Receptacles shall be supplied from isolated power circuits meeting the requirements of 14.2.8.4.2.

14.2.8.3.10.4

The design of the receptacle shall be such that sparks cannot be discharged into the chamber environment when the plug is inserted or withdrawn under electrical load.

14.2.8.3.10.5

One of the following shall be satisfied to protect against inadvertent withdrawal of the plug under electrical load:

(1) The receptacle–plug combination shall be of a locking type.

(2) The receptacle shall carry a label warning against unplugging under load, and the power cord shall not present a trip hazard for personnel moving in the chamber.

14.2.8.3.11 Switches.

Switches in the fixed wiring installation shall be waterproof.

14.2.8.3.11.1* Switch make and break contacts shall be housed in the electrical enclosure so that no sparks from arcing contacts can reach the chamber environment.

14.2.8.3.12* Temperature.

No electrical equipment installed or used in the chamber shall have an operating surface temperature in excess of 85°C (185°F).

14.2.8.3.13 Exposed Live Electrical Parts.

No exposed live electrical parts shall be permitted, except as specified in 14.2.8.3.13.1 and 14.2.8.3.13.2.

14.2.8.3.13.1 Exposed live electrical parts that are intrinsically safe shall be permitted.

14.2.8.3.13.2 Exposed live electrical parts that constitute patient monitoring leads, which are part of electromedical equipment, shall be permitted, provided that they meet the requirements of 14.2.8.3.17.

14.2.8.3.14 Motors.

Motors shall meet one of the following requirements:

(1) They shall comply with 501.125(A)(1) of *NFPA 70*, *National Electrical Code*, for the chamber pressure and oxygen concentration.

(2) They shall be of the totally enclosed types meeting 501.125(A)(2) or 501.125(A)(3) of *NFPA 70*, *National Electrical Code*.

14.2.8.3.15* Lighting.

14.2.8.3.15.1 Lighting installed or used inside the chamber shall be rated for a pressure of 1 ½ times the chamber operating pressure.

14.2.8.3.15.2 Permanently installed fixtures shall meet the following requirements:

(1) They shall be rated and approved for Class I (Division 1 or 2) classified areas.

(2) They shall have lens guards installed.

(3) They shall be located away from areas where they would experience physical damage from the normal movement of people and equipment.

14.2.8.3.15.3 Ballasts and other energy storage components that are part of the lighting circuit shall be installed outside the chamber in accordance with 14.2.8.1.4.

14.2.8.3.15.4 Portable fixtures intended for spot illumination shall be shatterproof or protected from physical damage.

14.2.8.3.16 Low-Voltage, Low-Power Equipment.

The requirements of 14.2.8.3.16.1 through 14.2.8.3.16.5 shall apply to sensors and signaling, alarm, communications, and remote-control equipment installed or used in the chamber for operation of the chamber.

14.2.8.3.16.1* Equipment shall be isolated from main power by one of the following means:

(1) Design of the power supply circuit

(2) Opto-isolation

(3) Other electronic isolation means

14.2.8.3.16.2 Circuits such as headset cables, sensor leads, and so forth, not enclosed as required in 14.2.8.3.7, shall meet one of the following requirements:

(1) They shall be part of approved intrinsically safe equipment.

(2) They shall be limited by circuit design to not more than 28 V and 0.5 A under normal or circuit-fault conditions.

14.2.8.3.16.3 Chamber speakers shall be of a design in which the electrical circuitry and wiring is completely enclosed.

14.2.8.3.16.4 The electrical rating of chamber speakers shall not exceed 28 V rms and 25 W.

14.2.8.3.16.5 Battery-operated, portable intercom headset units shall meet the requirements of 14.2.8.3.17.5 for battery-operated devices.

14.2.8.3.17* Portable Patient Care–Related Electrical Appliances.

14.2.8.3.17.1

The appliance shall be designed and constructed in accordance with Chapter 10.

14.2.8.3.17.2

The electrical and mechanical integrity of the appliance shall be verified and documented through an ongoing maintenance program as required in Chapter 10.

14.2.8.3.17.3

The appliance shall conform to the requirements of 14.2.8.3.1 and 14.2.8.3.12.

14.2.8.3.17.4

Appliances that utilize oxygen shall not allow oxygen accumulation in the electrical portions of the equipment under normal and abnormal conditions.

14.2.8.3.17.5 Battery-Operated Devices.

Battery-operated devices shall meet the following requirements:

(1) Batteries shall be fully enclosed and secured within the equipment enclosure.

(2) Batteries shall not be damaged by the maximum chamber pressure to which they are exposed.

(3) Batteries shall be of a sealed type that does not off-gas during normal use.

(4) Batteries or battery-operated equipment shall not undergo charging while located in the chamber.

(5) Batteries shall not be changed on in-chamber equipment while the chamber is in use.

(6) The equipment electrical rating shall not exceed 12 V and 48 W.

(7) Lithium and lithium ion batteries shall be prohibited in the chamber during chamber operations, unless the product has been accepted or listed for use in hyperbaric conditions by the manufacturer or a nationally recognized testing agency.

14.2.8.3.17.6 Cord-Connected Devices.

Cord-connected devices shall meet the following requirements:

(1) All portable, cord-connected equipment shall have an on/off power switch.

(2) The equipment electrical rating shall not exceed 120 V and 2 A, unless the electrical portions of the equipment are inert-gas purged.

(3) The plug of cord-connected devices shall not be used to interrupt power to the device.

14.2.8.4 Grounding and Ground-Fault Protection.

14.2.8.4.1

All chamber hulls shall be grounded to an electrical ground or grounding system that meets the requirements of Article 250, Grounding and Bonding, Section III, Grounding Electrode System and Grounding Electrode Conductor, of *NFPA 70*, *National Electrical Code*.

14.2.8.4.1.1

Grounding conductors shall be secured as required by Article 250, Grounding and Bonding, Section III, Grounding Electrode System and Grounding Electrode Conductor, of *NFPA 70*, *National Electrical Code*.

14.2.8.4.1.2

The material, size, and installation of the grounding conductor shall meet the requirements of Article 250, Grounding and Bonding, Section VI, Equipment Grounding and Equipment Grounding Conductors, of *NFPA 70*, *National Electrical Code*, for equipment grounding conductors.

14.2.8.4.1.3

The resistance between the grounded chamber hull and the electrical ground shall not exceed 1 ohm.

14.2.8.4.2

In health care facilities, electrical power circuits located within the chamber shall be supplied from an ungrounded electrical system equipped with a line isolation monitor with signal lamps and audible alarms.

14.2.8.4.2.1

The circuits specified in 14.2.8.4.2 shall meet the requirements of 517.160(A) and 517.160(B) of *NFPA 70*, *National Electrical Code*.

14.2.8.4.2.2

Branch circuits shall not exceed 125 V or 15 A.

14.2.8.4.3

Wiring located both inside and outside the chamber, that serves line level circuits and equipment located inside the chamber, shall meet the grounding and bonding requirements of 501.30 of *NFPA 70*, *National Electrical Code*.

14.2.8.5 Wiring Outside the Chamber.

Those electrical components that must remain functional for the safe termination of a dive following activation of the room sprinkler system shall be enclosed in waterproof housing.

14.2.8.5.1

All associated conduits shall meet the following requirements:

(1) They shall be waterproof.

(2) They shall meet the requirements of *NFPA 70*, *National Electrical Code*.

(3) They shall be equipped with approved drains.

14.2.8.5.2*

All other electrical devices outside the chamber shall meet the requirements of *NFPA 70*.

14.2.8.6 Additional Wiring and Equipment Requirements Inside Class B Chambers.

The requirements in 14.2.8.6 shall apply to Class B chambers whether they are pressurized with oxygen or with air.

14.2.8.6.1

Electrical equipment inside Class B chambers shall be restricted to communications functions and patient physiological monitoring leads.

14.2.8.6.1.1*

Each circuit shall be designed to limit the electrical energy to wire leads into the chamber under normal or fault conditions to not more than 28 V and 4.0 W. This requirement shall not exclude more stringent requirements imposed by other codes governing electromedical apparatus.

14.2.8.6.1.2

Communications wires shall be protected from physical damage and from coming into contact with flammable materials in the chamber by barriers or conduit.

14.2.8.6.1.3

Patient monitoring leads shall be part of approved electromedical apparatus meeting the requirements in 14.2.8.3.17.

14.2.8.6.2

Lighting inside the chamber shall be supplied from external sources.

14.2.8.6.3

No materials shall be permitted in a Class B chamber whose temperature exceeds 50° C (122° F), nor shall any electrical circuit inside a Class B chamber operate at a temperature exceeding 50°C (122°F).

14.2.9 Communications and Monitoring.

14.2.9.1 General.

14.2.9.1.1

Detectors, sensors, transducers, and communications equipment located inside the chamber shall meet the requirements of 14.2.8.3.16.

14.2.9.1.2

Wiring methods in the chamber shall meet the applicable requirements in 14.2.8.3.

14.2.9.1.3

The following equipment shall be installed outside the chamber or shall meet the requirements of 14.2.8.3.16:

(1) Control equipment

(2) Power amplifiers

(3) Output transformers

(4) Monitors associated with communications and monitoring equipment

14.2.9.2* Intercommunications.

14.2.9.2.1*

An intercommunications system shall connect all personnel compartments (locks) and the chamber operator's control console.

14.2.9.2.2

Oxygen mask microphones shall be intrinsically safe at the maximum proposed pressure and 95 ± 5 percent oxygen.

14.2.9.3 Combustible Gas Detection.

14.2.9.3.1

The chamber atmosphere shall be continuously monitored for combustible gas concentrations whenever any volatile agents are used in the chamber. *(See 14.2.4.3.3.1.)*

14.2.9.3.1.1

The monitor shall be set to provide audible and visual alarms at 10 percent lower explosive limit (LEL) for the particular gas used.

14.2.9.4 Oxygen Monitoring.

14.2.9.4.1

Oxygen levels shall be continuously monitored in any chamber in which nitrogen or other diluent gas is added to the chamber to reduce the volumetric concentration of oxygen in the atmosphere.

14.2.9.4.1.1

Oxygen monitors shall be equipped with audible and visual alarms.

14.2.9.4.2

Oxygen levels shall be continuously monitored in Class A chambers when breathing mixtures containing in excess of 21 percent oxygen by volume are being breathed by patients or attendants or any flammable agents are present in the chamber, or when either of these conditions exists.

14.2.9.4.2.1

Audible and visual alarms shall indicate volumetric oxygen concentrations in excess of 23.5 percent.

14.2.9.5 Carbon Dioxide Monitoring.

The chamber atmosphere shall be monitored for carbon dioxide levels during saturation operations whenever ventilation is not used.

14.2.9.6* Chamber Gas Supply Monitoring.

14.2.9.6.1*

Air from compressors shall be sampled at least every 6 months and after major repair or modification of the compressor(s).

14.2.9.6.2*

As a minimum, the air supplied from compressors to Class A chambers shall meet the requirements for CGA Grade E.

14.2.9.6.3

As a minimum, the air supplied from compressors to Class B chambers shall meet the requirements for CGA Grade E with the additional limit of no condensable hydrocarbons.

14.2.9.6.4

When air cylinders are used to provide breathing air in Class A or Class B chambers, the breathing air shall be medical air USP.

14.2.9.6.5

When cylinders are used to provide oxygen in Class A or Class B chambers, the gas shall be oxygen USP.

14.2.9.7

Electrical monitoring equipment used inside the chamber shall comply with the applicable requirements of 14.2.8.

14.2.9.8*

Closed-circuit television monitoring of the chamber interior shall be employed for chamber operators who do not have direct visual contact with the chamber interior from their normal operating location.

14.2.10 Other Equipment and Fixtures.

14.2.10.1

All furniture permanently installed in the hyperbaric chamber shall be grounded.

14.2.10.2*

Exhaust from all classes of chambers shall be piped outside of the building.

14.2.10.2.1

Each Class B chamber shall have an independent exhaust line.

14.2.10.2.2

The point of exhaust shall not create a hazard.

14.2.10.2.3

The point of exhaust shall not allow reentry of gases into the building.

14.2.10.2.4

The point of exhaust shall be protected by the provision of a minimum of 0.3 cm (0.12 in.) mesh screen and situated to prevent the intrusion of rain, snow, or airborne debris.

14.2.10.2.5

The point of exhaust shall be identified as an oxygen exhaust by a sign prohibiting smoking or open flame.

14.2.10.3

The supply piping for all air, oxygen, or other breathing mixtures from certified commercially supplied cylinders and portable containers shall be provided with a particulate filter of 66 microns or finer.

14.2.10.3.1

The particulate filter shall meet the construction requirements of ANSI/ASME PVHO-1, *Safety Standard for Pressure Vessels for Human Occupancy*, and be located as close as practical to the source.

14.3 Administration and Maintenance.

14.3.1 General.

14.3.1.1 Purpose.

Section 14.3 contains requirements for administration and maintenance that shall be followed as an adjunct to physical precautions specified in Section 14.2.

14.3.1.2* Recognition of Hazards.

The nature and recognition of hyperbaric hazards are outlined in Annex B of this document and shall be reviewed by the safety director.

14.3.1.3 Responsibility.

14.3.1.3.1

Personnel having responsibility for the hyperbaric facility, and those responsible for licensing, accrediting, or approving institutions or other facilities in which hyperbaric installations are employed, shall establish and enforce programs to fulfill the provisions of this chapter.

14.3.1.3.2*

Each hyperbaric facility shall designate an on-site hyperbaric safety director to be in charge of all hyperbaric equipment and the operational safety requirements of this chapter.

14.3.1.3.2.1

The safety director shall participate with facility management personnel and the hyperbaric physician(s) in developing procedures for operation and maintenance of the hyperbaric facility.

14.3.1.3.2.2

The safety director shall make recommendations for departmental safety policies and procedures.

14.3.1.3.2.3

The safety director shall have the authority to restrict or remove any potentially hazardous supply or equipment items from the chamber.

14.3.1.3.3*

The governing board shall be responsible for the care and safety of patients and personnel.

14.3.1.3.4*

By virtue of its responsibility for the professional conduct of members of the medical staff of the health care facility, the organized medical staff shall adopt and enforce regulations with respect to the use of hyperbaric facilities located in health care facilities.

14.3.1.3.4.1

The safety director shall participate in the development of these regulations.

14.3.1.3.5*

The safety director shall ensure that electrical, monitoring, life-support, protection, and ventilating arrangements in the hyperbaric chamber are inspected and tested as part of the routine maintenance program of the facility.

14.3.1.4 Rules and Regulations.

14.3.1.4.1* General.

The administrative, technical, and professional staffs shall jointly develop policies for management of the hyperbaric facility.

14.3.1.4.1.1

Upon adoption, the management policies shall be available in the facility.

14.3.1.4.2

The medical director of hyperbaric medicine and the safety director shall jointly develop the minimum staff qualifications, experience, and complement based on the following:

(1) Number and type of hyperbaric chambers in use

(2) Maximum treatment capacity

(3) Type of hyperbaric therapy normally provided

14.3.1.4.3

All personnel, including those involved in maintenance and repair of the hyperbaric facility, shall be trained on the purpose, application, operation, and limitations of emergency equipment.

14.3.1.4.4

Emergency procedures specific to the hyperbaric facility shall be established.

14.3.1.4.4.1*

All personnel shall be trained in emergency procedures.

14.3.1.4.4.2

Personnel shall be trained to control the chamber and decompress occupants when all powered equipment has been rendered inoperative.

14.3.1.4.5*

Emergency procedures and fire training drills shall be conducted at least annually and documented by the safety director.

14.3.1.4.6

When an inspection, test, or maintenance procedure of the fire suppression system results in the system being placed out of service, a protocol shall be followed that notifies appropriate personnel and agencies of the planned or emergency impairment.

14.3.1.4.7

A sign indicating the fire suppression system is out of service shall be conspicuously placed on the operating console until the fire suppression system is restored to service.

14.3.1.4.8

During chamber operations with an occupant(s) in a chamber, the operator shall be physically present and shall maintain visual or audible contact with the control panel or the chamber occupant(s).

14.3.1.5 General.

14.3.1.5.1 Potential Ignition Sources.

14.3.1.5.1.1*

The following shall be prohibited from inside the chamber and the immediate vicinity outside the chamber:

(1) Smoking

(2) Open flames

(3) Hot objects

14.3.1.5.1.2

The following shall be prohibited from inside the chamber:

(1) Personal warming devices (e.g., therapeutic chemical heating pads, hand warmers, pocket warmers)

(2) Cell phones and pagers

(3) Sparking toys

(4) Personal entertainment devices

14.3.1.5.2 Flammable Gases and Liquids.

14.3.1.5.2.1

Flammable agents, including devices such as laboratory burners employing bottled or natural gas and cigarette lighters, shall be prohibited inside the chamber and from the proximity of the compressor intake.

14.3.1.5.2.2

For Class A chambers, flammable agents used for patient care, such as alcohol swabs, parenteral alcohol-based pharmaceuticals, and topical creams, shall be permitted in the chamber if the following conditions are met:

(1) Such use is approved by the safety director or other authority having jurisdiction.

(2) * The quantities of such agents are limited so that they are incapable of releasing sufficient flammable vapor into the chamber atmosphere to exceed the LEL for the material.

(3) A safety factor is included to account for the localized concentrations, stratification, and the absence of ventilation.

(4) The oxygen monitoring requirement of 14.2.9.4.2 is observed.

14.3.1.5.2.3

Flammable liquids, gases, or vapors shall not be permitted inside any Class B chamber.

14.3.1.5.3* Personnel.

14.3.1.5.3.1

Antistatic procedures, as directed by the safety director, shall be employed whenever atmospheres containing more than 23.5 percent oxygen by volume are used.

14.3.1.5.3.2

In Class A and Class B chambers with atmospheres containing more than 23.5 percent oxygen by volume, electrical grounding of the patient shall be ensured by the provision of a high-impedance conductive pathway in contact with the patient's skin.

14.3.1.5.3.3

Shoes having ferrous nails that make contact with the floor shall not be permitted to be worn in Class A chambers.

14.3.1.5.4* Textiles.

14.3.1.5.4.1

Except where permitted in 14.3.1.5.4.3, silk, wool, or synthetic textile materials, or any combination thereof, shall be prohibited in Class A or Class B chambers.

14.3.1.5.4.2*

Garments permitted inside of chambers shall be as follows:

(1) Garments fabricated of 100 percent cotton or a blend of cotton and polyester fabric shall be permitted in Class A chambers.

(2) Garments fabricated of 100 percent cotton, or a blend of cotton and polyester fabric containing no more than 50 percent polyester, shall be permitted in Class B chambers.

14.3.1.5.4.3*

The physician or surgeon in charge, with the concurrence of the safety director, shall be permitted to use one of the following prohibited items in the chamber:

(1) Suture material

(2) Alloplastic devices

(3) Bacterial barriers

(4) Surgical dressings

(5) Biological interfaces

(6) Synthetic textiles

14.3.1.5.4.4

Physician and safety director approval to use prohibited items shall be stated in writing for all prohibited materials employed. *(See A.14.3.1.3.2.)*

14.3.1.5.4.5 Upholstered Furniture.

(A)

Upholstered furniture (fixed or portable), shall be resistant to a cigarette ignition (i.e., smoldering) in accordance with one of the following:

(1) The components of the upholstered furniture shall meet the requirements for Class 1 when tested in accordance with NFPA 260, *Standard Methods of Tests and Classification System for Cigarette Ignition Resistance of Components of Upholstered Furniture*; ASTM E 1353, *Standard Test Methods for Cigarette Ignition Resistance of Components of Upholstered Furniture*; or California Technical Bulletin 133, *Flammability Test Procedure for Seating Furniture for Use in Public Occupancies*.

(2) Mocked-up composites of the upholstered furniture shall have a char length not exceeding 1 ½ in. (38 mm) when tested in accordance with NFPA 261, *Standard Method of Test for Determining Resistance of Mock-Up Upholstered Furniture Material Assemblies to Ignition by Smoldering Cigarettes*, or ASTM E 1352, *Standard Test Method for Cigarette Ignition Resistance of Mock-Up Upholstered Furniture Assemblies*.

(B)

Upholstered furniture shall have limited rates of heat release when tested in accordance with ASTM E 1537, *Standard Test Method for Fire Testing of Upholstered Furniture*, as follows:

(1) The peak rate of heat release for the single upholstered furniture item shall not exceed 80 kW.

(2) The total heat released by the single upholstered furniture item during the first 10 minutes of the test shall not exceed 25 MJ.

14.3.1.5.4.6 Mattresses.

Mattresses shall have a char length not exceeding 2 in. (51 mm) when tested in accordance with 16 CFR 1632, *Standard for the Flammability of Mattresses and Mattress Pads* (FF 4-72); 16 CFR Part 1633, *Standard for the Flammability (Open Flame) of Mattress Sets*; or California Technical Bulletin 129, *Flammability Test Procedure for Mattresses for Use in Public Buildings*.

Mattresses shall have limited rates of heat release when tested in accordance with ASTM E 1590, *Standard Test Method for Fire Testing of Mattresses*, as follows:

(1) The peak rate of heat release for the mattress shall not exceed 100 kW. The peak rate of heat release for the mattress shall not exceed 100 kW.

(2) The total heat released by the mattress during the first 10 minutes of the test shall not exceed 25 MJ.

14.3.1.5.4.7

Fill materials shall comply with California Technical Bulletin 117 Requirements, *Test Procedure and Apparatus for Testing the Flame Retardance of Resilient Filling Materials Used in Upholstered Furniture*.

14.3.1.5.4.8

For materials with fire-retardant coatings, the material shall be maintained in accordance with the manufacturer's instructions to retain the fire-retardant properties.

14.3.1.5.4.9

Exposed foamed plastic materials shall be prohibited.

14.3.1.5.5

The use of flammable hair sprays, hair oils, and skin oils shall be forbidden for all chamber occupants/patients as well as personnel.

14.3.1.5.5.1

Whenever possible, patients shall be stripped of all clothing, particularly if it is contaminated by dirt, grease, or solvents, and then reclothed. *(See A.14.3.1.5.4.)*

14.3.1.5.5.2

All cosmetics, lotions, and oils shall be removed from the patient's body and hair.

14.3.1.5.6

All other fabrics used in the chamber, such as sheets, pillow cases, and blankets, shall conform to 14.3.1.5.4.1 and 14.3.1.5.4.2.

14.3.1.5.7

Drapes used within the chamber shall meet the flame propagation performance criteria contained in NFPA 701, *Standard Methods of Fire Tests for Flame Propagation of Textiles and Films*.

14.3.1.5.8

Clothing worn by patients in Class A or Class B chambers and personnel in Class A chambers shall, prior to each treatment, conform to the following:

(1) They shall be issued by the hyperbaric facility or specifically approved by the safety director for hyperbaric use.

(2) They shall be uncontaminated.

(3) They shall be devoid of prohibited articles prior to chamber pressurization.

14.3.2 Equipment.

14.3.2.1

All equipment used in the hyperbaric chamber shall comply with Section 14.2, including the following:

(1) All electrical and mechanical equipment necessary for the operation and maintenance of the hyperbaric facility

(2) Any medical devices and instruments used in the facility

14.3.2.1.1

Use of unapproved equipment shall be prohibited. *(See 14.3.1.5.4.3.)*

14.3.2.1.2

The following devices shall not be operated in the hyperbaric chamber unless approved by the safety director for such use:

(1) Portable X-ray devices

(2) Electrocautery equipment

(3) High-energy devices

14.3.2.1.3

Photographic equipment employing the following shall not remain in the chamber when the chamber is pressurized:

(1) Photoflash

(2) Flood lamps

14.3.2.1.4

The use of Class 1 or Class 2 lasers as defined by ANSI Z136.3 *American National Standard for the Safe Use of Lasers in Health Care Facilities*, shall be permitted.

14.3.2.1.5

Equipment known to be, or suspected of being, defective shall not be introduced into any hyperbaric chamber or used in conjunction with the operation of such chamber until repaired, tested, and accepted by qualified personnel and approved by the safety director. *(See 14.3.1.3.2.)*

14.3.2.1.6*

Paper brought into the chamber shall be stored in a closed metal container.

14.3.2.1.7

Containers used for paper storage shall be emptied after each chamber operation.

14.3.2.1.8

Equipment that does not meet the temperature requirements of 500.8(A), 500.8(B), and 500.8(C) of *NFPA 70*, *National Electrical Code*, shall not be permitted in the chamber.

14.3.2.2*

The following shall be all-metal to the extent possible:

(1) Oxygen containers

(2) Valves

(3) Fittings

(4) Interconnecting equipment

14.3.2.3

The following shall be compatible with oxygen under service conditions:

(1) Valve seats

(2) Gaskets

(3) Hose

(4) Lubricants

14.3.2.4

Equipment used inside the chamber requiring lubrication shall be lubricated with oxygen-compatible material.

14.3.2.4.1

Factory-sealed antifriction bearings shall be permitted to be used with standard hydrocarbon lubricants in Class A chambers that do not employ atmospheres of increased oxygen concentration.

14.3.2.5*

Equipment made of the following shall be prohibited from the chamber interior:

(1) Cerium

(2) Magnesium

(3) Magnesium alloys

14.3.2.6*

In the event that radiation equipment is introduced into a hyperbaric chamber, hydrocarbon detectors shall be installed.

14.3.2.6.1

In the event that flammable gases are detected in excess of 1000 ppm, radiation equipment shall not be operated until the chamber atmosphere is cleared.

14.3.3 Handling of Gases.

14.3.3.1

The institution's administrative personnel shall develop policies for safe handling of gases in the hyperbaric facility. *(See 14.3.1.5.2.)*

14.3.3.2

Oxygen and other gases shall not be introduced into the chamber in the liquid state.

14.3.3.3

Flammable gases shall not be used or stored in the chamber or in the hyperbaric facility.

14.3.3.4*

Pressurized containers of gas shall be permitted to be introduced into the hyperbaric chamber, provided that the container and its contents are approved for such use by the safety director.

14.3.4 Maintenance.

14.3.4.1 General.

14.3.4.1.1

The hyperbaric safety director shall ensure that all valves, regulators, meters, and similar equipment used in the hyperbaric chamber are compensated for use under hyperbaric conditions and tested as part of the routine maintenance program of the facility.

14.3.4.1.1.1

Pressure relief valves shall be tested and calibrated as part of the routine maintenance program of the facility.

14.3.4.1.2

The hyperbaric safety director shall ensure that all gas outlets in the chambers are labeled or stenciled in accordance with CGA C-4, *Standard Method of Marking Portable Compressed Gas Containers to Identify the Material Contained*.

14.3.4.1.3

The requirements set forth in Section 5.1 and NFPA 55, *Compressed Gases and Cryogenic Fluids Code*, concerning the storage, location, and special precautions required for medical gases shall be followed.

14.3.4.1.4

Storage areas for hazardous materials shall not be located in the room housing the hyperbaric chamber. *(See 14.2.1.)*

14.3.4.1.4.1

Flammable gases, except as provided in 14.3.1.5.2.2 (1), shall not be used or stored in the hyperbaric room.

14.3.4.1.5

All replacement parts and components shall conform to original design specification.

14.3.4.2 Maintenance Logs.

14.3.4.2.1

Installation, repairs, and modifications of equipment related to a chamber shall be evaluated by engineering personnel, tested under pressure, and approved by the safety director.

14.3.4.2.1.1

Logs of all tests shall be maintained.

14.3.4.2.2

Operating equipment logs shall be maintained by engineering personnel.

14.3.4.2.2.1

Operating equipment logs shall be signed before chamber operation by the person in charge. *(See A.14.3.1.3.2.)*

14.3.4.2.3

Operating equipment logs shall not be taken inside the chamber.

14.3.5 Electrical Safeguards.

14.3.5.1

Electrical equipment shall be installed and operated in accordance with 14.2.8.

14.3.5.1.1

All electrical circuits shall be tested in accordance with the routine maintenance program of the facility.

14.3.5.1.1.1

Electrical circuit tests shall include the following:

(1) Ground-fault check to verify that no conductors are grounded to the chamber

(2) Test of normal functioning *(see 14.2.8.2.2)*

14.3.5.1.2

In the event of fire, all nonessential electrical equipment within the chamber shall be de-energized before extinguishing the fire.

14.3.5.1.2.1

Smoldering, burning electrical equipment shall be de-energized before extinguishing a localized fire involving only the equipment. *(See 14.2.5.)*

14.3.6* Electrostatic Safeguards.

14.3.6.1 Administration. (Reserved)

14.3.6.2 Maintenance.

14.3.6.2.1 Furniture Used in the Chamber.

14.3.6.2.1.1

Conductive devices on furniture and equipment shall be inspected to ensure that they are free of wax, lint, or other extraneous material that could insulate them and defeat the conductive properties.

14.3.6.2.1.2*

Casters or furniture leg tips shall not be capable of impact sparking.

14.3.6.2.1.3

Casters shall not be lubricated with oils or other flammable materials.

14.3.6.2.1.4

Lubricants shall be oxygen compatible.

14.3.6.2.1.5

Wheelchairs and gurneys with bearings lubricated and sealed by the manufacturer shall be permitted in Class A chambers where conditions prescribed in 14.2.9.4 are met.

14.3.6.2.2 Conductive Accessories.

Conductive accessories shall meet conductivity and antistatic requirements.

14.3.6.2.3*

Materials containing rubber shall be inspected as part of the routine maintenance program of the facility, especially at points of kinking.

14.3.6.3 Fire Protection Equipment Inside Hyperbaric Chambers.

14.3.6.3.1

Electrical switches, valves, and electrical monitoring equipment associated with fire detection and extinguishment shall be visually inspected before each chamber pressurization.

14.3.6.3.2

Fire detection equipment shall be tested each week, and full testing, including discharge of extinguishing media, shall be conducted annually.

14.3.6.3.3

Testing shall include activation of trouble circuits and signals.

14.3.6.4* Housekeeping.

A housekeeping program shall be implemented, whether or not the facility is in regular use.

14.3.6.4.1

The persons assigned to the task of housekeeping shall be trained in the following:

(1) Potential damage to the equipment from cleaning procedures

(2) Potential personal injury

(3) Specific cleaning procedures

(4) Equipment not to be cleaned

Additional Proposed Changes

File Name	Description	Approved
2014_FGI_HOP_hyberbaric_facilities.docx	FGI Guidelines section on Hyperbaric	

Statement of Problem and Substantiation for Public Input

This chapter needs to be coordinate with the FGI Guidelines chapter. The FGI is adopted in over 40 states and it is confusing to have different standards that conflict. with quick review I didn't see any major changes that would be needed in NFPA 99. It appears that changes, if any, may need to be submitted to FGI which is accepting public input until early October.

Submitter Information Verification

Submitter Full Name: CHAD BEEBE
Organization: ASHE - AHA
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 15:27:04 EDT 2015

Committee Statement

Resolution: The TC agrees that the requirements of NFPA 99 should align with the FGI Hyperbaric facilities requirements. A Task group will be formed to look at what revisions can be submitted to FGI during that document's revision cycle for alignment.

Public Input No. 342-NFPA 99-2015 [New Section after 14.1]

New: 14.1.1 Scope

Hyperbaric facilities that are conducting any form of medical treatment, and or not located in a designated health care facility, including residential occupancies, shall comply with the requirements of the current edition of NFPA 101, Life Safety Code, sections 8.7.5 and A8.7.5.

Statement of Problem and Substantiation for Public Input

Beginning with the 2000 edition of NFPA 101, Life Safety Code, compliance to the hyperbaric facility chapter of NFPA 99, Health Care Facilities, has been mandated by reference. This action was taken as a result of a number of hyperbaric treatment centers that were opening across the country in business occupancies such as strip shopping malls, etc. In some instances, the owners of these businesses were able to successfully argue that since they were not housed in a health care occupancy, they did not need to comply with the hyperbaric requirements of NFPA 99 even though they were conducting patient treatments. The NFPA is to be applauded for taking such an action. In doing so, they were very specific in stating that compliance was expected in all occupancy classifications.

Here we are 15 years later and what has changed? The number of hyperbaric facilities, both those located in health care occupancies and non-health care occupancies, has grown significantly. At the time the 2000 edition of NFPA 101 was issued there were approximately 500 hyperbaric facilities located in health care occupancies. There are now over 1200. Facilities in health care occupancies are not the issue as they are generally compliant with NFPA 99 and have extensive oversight. The problem resides in those facilities that are located in non-health care occupancies such as spas, business offices, malls, homes and, in one instance, even a church! These locations have no comprehensive oversight. Unfortunately, there is no way of knowing how many of these facilities exist as there is no mandatory reporting system in place for them. Even though the NFPA 101 reference to NFPA 99 has existed since 2000, it does not appear to be well-known. Perhaps this is so because there is no link in NFPA 99 to point AHJs to NFPA 101.

While some of these non-health care facilities use traditional hyperbaric chambers, which are well-regulated, there are an alarming number that are using what is generally called a “soft” hyperbaric chamber. These chambers are Class II medical devices that have been cleared by the FDA for the treatment of acute mountain sickness but are being used almost exclusively for a number of off-label indications such as autism, stroke, cerebral palsy, etc. This is not the point of the substantiation however. The point is that they do not meet any of the code requirements of NFPA 99. They do not comply with ASME PVHO-1 nor are they installed in accordance to the code……there is no installation required. They are portable and can be operational in less than 15 to 20 minutes. There is no mechanism to alert the AHJ that such a chamber is coming into their jurisdiction so they come in under the radar. How they are being used is a greater concern. They are frequently used with oxygen concentrators (in violation of FDA restrictions) and the use of a variety of electronic devices such as iPads, iPods, laptop computers, etc. while inside the chamber is commonly promoted. This is a well-known fire hazard. It is reported that there have been more than 10,000 of these types of chambers sold.

In 2011, a young 19 y.o. male died while inside one these “soft” chambers. The chamber was installed in his home and it was his custom to sleep in the chamber each night. One evening the chamber air supply became disconnected from the chamber and the young man suffocated. Had this type of chamber being used in the home environment been regulated perhaps this death would not have occurred.

The primary purpose of this input is to highlight the NFPA 101 requirement so that it is more widely known among the AHJ community.

Submitter Information Verification

Submitter Full Name: WILBUR WORKMAN
Organization: Undersea & Hyperbaric Medical Society
Affilliation: Undersea & Hyperbaric Medical Society
Street Address:
City:
State:
Zip:
Submittal Date: Sat Jul 04 13:43:53 EDT 2015

Committee Statement

Resolution: FR-302-NFPA 99-2015

Statement: Beginning with the 2000 edition of NFPA 101, Life Safety Code, compliance to the hyperbaric facility chapter of NFPA 99, Health Care Facilities, has been mandated by reference. This action was taken as a result of a number of hyperbaric treatment centers that were opening across the country in business occupancies such as strip shopping malls, etc. In some instances, the owners of these businesses were able to successfully argue that since they were not housed in a health care occupancy, they did not need to comply with the hyperbaric requirements of NFPA 99 even though they were conducting patient treatments. In doing so, they were very specific in stating that compliance was expected in all occupancy classifications. The primary purpose of this revision is to highlight the NFPA 101 or other applicable codes requirement so that it is more widely known among the AHJ community.

Public Input No. 323-NFPA 99-2015 [Section No. 14.1.3]

14.1.3 Category of Care.

14.1.3.1 Category 1 Care.

14.1.3.1.1

Where interruption or failure of medical gas supply is likely to cause major injury or death of patients, staff, or visitors, the level of care shall be considered Category 1 in the requirements for medical gas systems in hyperbaric facilities.

14.1.3. 1. 2

Where interruption or failure of electrical service is likely to cause major injury or death of patients, staff, or visitors, the level of care shall be considered Category 1 in the requirements for electrical service in hyperbaric facilities.

14.1.3.2 Category 2 Care.

14.1.3.2.1

Where interruption or failure of medical gas supply is likely to cause minor injury of patients, staff, or visitors, the level of care shall be considered Category 2 in the requirements for medical gas systems in hyperbaric facilities.

14.1.3. 2.2

Where interruption or failure of electrical service is likely to cause minor injury of patients, staff, or visitors, the level of care shall be considered Category 2 in the requirements for electrical service in hyperbaric facilities.

14.1. 3 .3 _ Category 3 Care.

14.1.3.3.1

Where interruption or failure of medical gas supply is not likely to cause injury to patients, staff, or visitors, the level of care shall be considered Category 3 in the requirements for medical gas systems in hyperbaric facilities.

14.1.3. 3.2

Where interruption or failure of electrical service is not likely to cause injury to patients, staff, or visitors, the level of care shall be considered Category 3 in the requirements for electrical service in hyperbaric facilities.

14.1.3. 4 _ Category 4 Care. (Reserved)

Statement of Problem and Substantiation for Public Input

The electrical service requirements of hyperbaric facilities should be based on the relative risk of losing electrical power. This risk varies with the types of chamber equipment and acuity of patients treated.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 324-NFPA 99-2015 [Section No. 14.2.8.2]	

Submitter Information Verification

Submitter Full Name: ROBERT SHEFFIELD
Organization: INTERNATIONAL ATMO INC
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jul 02 17:27:25 EDT 2015

Committee Statement

Resolution: FR-303-NFPA 99-2015

Statement: The electrical service requirements of hyperbaric facilities have been revised to be based on the relative risk of losing electrical power. This risk varies with the types of chamber equipment and acuity of patients treated. The terminology has been modified to closer align with the rest of the document.

Public Input No. 47-NFPA 99-2015 [Section No. 14.2.1.1.7]

14.2.1.1.7

When used for hyperbaric procedures, the room or rooms housing the Class A or Class B chambers shall be for the exclusive use of the hyperbaric operation.

Add Annex Note: A.14.2.1.1.7.Precautions should bein place for monitoring of items used to prepare a patient or staff member forentry into the hyperbaric chamber to prevent the entry of prohibited items intothe hyperbaric chamber.

Additional Proposed Changes

File Name	Description	Approved
PC_38_HYP.pdf	NFPA 99_PC38	

Statement of Problem and Substantiation for Public Input

NOTE: The following Public Input appeared as “Reject but Hold” in Public Comment No. 38 of the (A2014) Second Draft Report for NFPA 99 and per the Regs. At 4.4.8.3.1.
Defining Hyperbaric Procedures affords the AHJs and end users an understanding of the activities allowed in the hyperbaric room.

Submitter Information Verification

Submitter Full Name: TC ON HEA-HYP
Organization: NFPA
Street Address:
City:
State:
Zip:
Submittal Date: Thu Apr 09 14:17:17 EDT 2015

Committee Statement

Resolution: FR-319-NFPA 99-2015
Statement: It has been shown by Sheffield et all, that some 80% of mishaps have occurred in chambers because of some prohibited item allowed to come into the chamber during operation. The UHMS has adopted a position statement regarding a safety time out modeled after surgery prior to chamber operations. Requiring a per-treatment safety check will help keep hazards out of the chamber. Additional annex material has been added to guide the user on what this check might include.

Public Input No. 531-NFPA 99-2015 [Section No. 14.2.1.2 [Excluding any Sub-Sections]]

A hydraulically calculated automatic wet pipe sprinkler system meeting the requirements of NFPA 13, *Standard for the Installation of Sprinkler Systems*,~~ or an~~ an automatic water mist fire protection system installed in accordance with NFPA 750, *Standard on Water Mist Fire Protection Systems*, a wet chemical extinguishing system per NFPA 17A, or a clean agent system shall be installed in the room housing a Class A, Class B, or Class C chamber and in any ancillary equipment rooms.

Statement of Problem and Substantiation for Public Input

There are development in fire system equal to better than wet sprinkler sytems

Submitter Information Verification

Submitter Full Name: DEEPAK TALATI
Organization: SECHRIST INDUSTRIES INC
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 18:22:54 EDT 2015

Committee Statement

Resolution: FR-305-NFPA 99-2015
Statement: There are other fire suppression systems that can provide appropriate protection for these rooms other than just wet sprinkler systems. This revision allows the use of clean agent systems designed in accordance with NFPA 2001 to be utilized as a design option.

Public Input No. 410-NFPA 99-2015 [New Section after 14.2.1.2.1]

14.2.1.2.2
The room housing a Class A, Class B, or Class C chamber shall contain a minimum of one portable fire extinguisher.

Statement of Problem and Substantiation for Public Input

Currently there is no required for a portable fire extinguisher to be located in the room housing hyperbaric chambers Class A, Class B, or Class C.

Submitter Information Verification

Submitter Full Name: RICHARD BARRY
Organization: HEALOGICS
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jul 05 22:02:01 EDT 2015

Committee Statement

Resolution: FR-306-NFPA 99-2015
Statement: Currently there is no requirement for a portable fire extinguisher to be located in the room housing hyperbaric chambers Class A, Class B, or Class C. This revision requires that one be available and that it be appropriate for a range of potential types of fires that can be encountered in these rooms.

Public Input No. 235-NFPA 99-2015 [Section No. 14.2.1.4.4]

14.2.1.4.4 ~~– General.~~

~~Where an oxygen system is installed for hyperbaric treatments, it shall comply with the requirements for the appropriate level as determined in 14.2.1.4.4.2 through 14.2.1.4.4.7 .~~

~~14.2.1.4.4.1 –~~

Hyperbaric oxygen systems for Category 1, Category 2, and Category 3 care connected directly to a hospital's oxygen system shall comply with Section 5.1, as applicable, except as noted in 14.2.1.4.4.2 1 .

14.2.1.4.4.2 – 1 _ Central Supply Systems.

Oxygen systems shall comply with 5.1.3.5, as applicable, except as follows:

(1) An emergency oxygen supply connection (EOSC) is not required for the hyperbaric oxygen system.

(2) An in-building emergency reserve (IBER) is not required for the hyperbaric oxygen system.

14.2.1.4.4.3 – 5 _

Hyperbaric stand-alone oxygen systems for Category 1 and Category 2 care shall comply with Section 5.1, as applicable, except as noted in 14.2.1.4.4 5 .4 1 .

14.2.1.4.4 5 .4 – 1 _ Central Supply Systems.

Oxygen systems shall comply with 5.1.3.5, as applicable, except as follows:

(1) An EOSC is not required for the hyperbaric oxygen system.

(2) An IBER is not required for the hyperbaric oxygen system.

14.2.1.4.4.5 – 6 _ Warning Systems. ~~(A) –~~

14.2.1.4.6.1 _

Oxygen systems shall comply with 5.1.9, as applicable, except that warning systems shall be permitted to be a single master/area alarm panel.

~~(B)~~ – 14.2.1.4.6.2 _

The alarm panel shall be located in the room housing the chamber(s) to allow for easy audio and visual monitoring by the chamber operator

14.2.1.4.4.6 – 7 _

Hyperbaric stand-alone oxygen systems for Category 3 care shall comply with Section 5.2, as applicable, except as noted in 14.2.1.4.4. 7. 1 .

14.2.1.4.4 7 .7 – 1 _ Central Supply Systems.

Oxygen systems shall comply with 5.1.3.5, as applicable, except as follows:

(1) If the operating oxygen supply consists of high pressure cylinders designed with a primary and secondary source, no reserve supply is required.

(2) If the operating oxygen supply consists of liquid containers designed with a primary and secondary source, a reserve with a minimum supply of 15 minutes is required.

(3) If the operating oxygen supply consists of a bulk primary, a reserve with a minimum supply of 15 minutes is required.

(4) An EOSC is not required for the hyperbaric oxygen system.

(5) An IBER is not required for the hyperbaric oxygen system.

Statement of Problem and Substantiation for Public Input

The manual of style allows for a maximum of 6 levels of paragraph numbering. Section 14.2.1.4.4 contains 5 paragraphs that are meant to be subordinate to their preceding paragraph but were not numbered as such because it would require a 7th level of numbering. The requirement in 14.2.1.4.4 is unnecessary and could be removed, allowing for renumbering of subsequent paragraphs. In the new numbering scheme, paragraphs 14.2.1.4.4.2, 14.2.1.4.4.4, 14.2.1.4.4.5(A), 14.2.1.4.4.5(B), and 14.2.1.4.4.7 are obviously subordinate to their preceding paragraphs.

Submitter Information Verification

Submitter Full Name: ROBERT SHEFFIELD
Organization: INTERNATIONAL ATMO INC

Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 23 18:55:56 EDT 2015

Committee Statement

Resolution: FR-307-NFPA 99-2015

Statement: The manual of style allows for a maximum of 6 levels of paragraph numbering. Section 14.2.1.4.4 contains 5 paragraphs that are meant to be subordinate to their preceding paragraph but were not numbered as such because it would require a 7th level of numbering. The requirement in 14.2.1.4.4 is unnecessary and could be removed, allowing for renumbering of subsequent paragraphs. In the new numbering scheme, paragraphs 14.2.1.4.4.2, 14.2.1.4.4.4, 14.2.1.4.4.5(A), 14.2.1.4.4.5(B), and 14.2.1.4.4.7 are obviously subordinate to their preceding paragraphs.

Public Input No. 233-NFPA 99-2015 [Section No. 14.2.1.5]

14.2.1. ~~5~~ 7 Storage and Handling of Medical Gases.

Storage and handling of medical gases shall meet the applicable requirements of Chapter 5.

Statement of Problem and Substantiation for Public Input

The existing placement of this paragraph could be interpreted to apply only to oxygen systems. Moving it to the end of the section makes it more obvious that it applies to all medical gases.

Submitter Information Verification

Submitter Full Name: ROBERT SHEFFIELD
Organization: INTERNATIONAL ATMO INC
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 23 15:24:48 EDT 2015

Committee Statement

Resolution: FR-309-NFPA 99-2015
Statement: The existing placement of this paragraph could be interpreted to apply only to oxygen systems. Moving it to the end of the section makes it more obvious that it applies to all medical gases. Adding reference to chapter 11 also add another reference to storage.

Public Input No. 446-NFPA 99-2015 [New Section after 14.2.1.6.4.7]

TITLE OF NEW CONTENT

Type your content here ...

14.2.1.6.4.7 (3) A medical air cylinder directly connected to a Class B or Class C chamber and used to provide air to that chamber shall be permitted to be in the same room as the chamber. The cylinder shall be considered to be "in use" and shall not be counted when determining the total volume of medical gas outside of a storage area in Section 11.3.

Statement of Problem and Substantiation for Public Input

This proposed change applies to free-standing hyperbaric facilities, such as wound care centers using Class B or Class C chambers. It is typical for a chamber in such a facility to have a large H-size cylinder of medical air next to, and directly connected to, the chamber to provide "air breaks" during administration of oxygen therapy. A facility with more than one chamber together in a treatment room then has more than 300 CF of gas in the room, since one H-size cylinder contains 242 CF of gas. This requires the cylinders to be stored in a separate room and piped to each chamber, adding an unnecessary level of complexity and cost to the chamber operation.

Submitter Information Verification

Submitter Full Name: KOVEN SMITH
Organization: SHANDS HOSPITAL
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 14:09:08 EDT 2015

Committee Statement

Resolution: FR-344-NFPA 99-2015
Statement: It is typical for a chamber in a facility to have a large H-size cylinder of medical air next to, and directly connected to, the chamber to provide "air breaks" during administration of oxygen therapy. A facility with more than one chamber together in a treatment room then has more than 300 CF of gas in the room, since one H-size cylinder contains 242 CF of gas. This requires the cylinders to be stored in a separate room and piped to each chamber, adding an unnecessary level of complexity and cost to the chamber operation.

Public Input No. 232-NFPA 99-2015 [Section No. 14.2.2.5.3]

14.2.2.5.3

If the interior of a Class A chamber is treated (painted) ~~with a finish described in 14.2.2.5~~ , the cure procedure and minimum duration for each layer of paint/coating to off-gas shall be in accordance with the manufacturer's application instructions.

Statement of Problem and Substantiation for Public Input

The existing reference to 14.2.2.5 is inaccurate. The better reference would be to 14.2.2.5.1. However, based on the flow of the requirements in section 14.2.2.5, specific reference back to the performance criteria of the paint/coating is unnecessary.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 231-NFPA 99-2015 [Section No. A.14.2.2.5]	Cleaning up references within the same section.

Submitter Information Verification

Submitter Full Name: ROBERT SHEFFIELD
Organization: INTERNATIONAL ATMO INC
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 23 15:14:42 EDT 2015

Committee Statement

Resolution: FR-311-NFPA 99-2015
Statement: The existing reference to 14.2.2.5 is inaccurate. The better reference would be to 14.2.2.5.1. However, based on the flow of the requirements in section 14.2.2.5, specific reference back to the performance criteria of the paint/coating is unnecessary.

Public Input No. 493-NFPA 99-2015 [Section No. 14.2.4.2.4.1]

14.2.4.2.4.1

The air treatment packages shall include automatic safeguards.

Statement of Problem and Substantiation for Public Input

The requirement for automatic safeguards is unclear. The code should specify a performance parameter or objective.

Submitter Information Verification

Submitter Full Name: Kevin Posey
Organization: International ATMO, Inc.
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 16:37:34 EDT 2015

Committee Statement

Resolution: FR-312-NFPA 99-2015

Statement: Section 14.2.4.2.4.1 is unnecessary and can add confusion. The prior requirement (14.2.4.2.4) affords adequate protection to ensure that quality air is provided from compressors. Other requirements for maintaining air quality are also in place elsewhere in the Chapter.

Public Input No. 239-NFPA 99-2015 [Section No. 14.2.4.5]

14.2. ~~4.~~ 5 ~~Emergency Depressurization and~~ Facility Evacuation Capability.

14.2. ~~4.~~ 5.1

Class A chambers shall be capable of depressurizing from 3 ATA (304.0 kPa) to ambient pressure in not more than 6 minutes.

14.2. ~~4.~~ 5.2

Class B chambers shall be capable of depressurizing from 3 ATA (304.0 kPa) to ambient pressure in not more than 2 minutes.

14.2. ~~4.~~ 5.3 * .

A means for respiratory and eye protection from combustion products allowing unrestricted mobility shall be available outside a Class A or Class B chamber for use by personnel in the event the air in the vicinity of the chamber is fouled by smoke or other combustion products.

~~14.2.4.5.4~~ –

~~The time required to evacuate all persons from a hyperbaric area with a full complement of chamber occupants all at treatment pressure shall be measured annually during the fire training drill required by 14.3.1.4.5 .~~

~~14.2.4.5.4.1~~ –

~~The occupants for this training drill shall be permitted to be simulated.~~

Statement of Problem and Substantiation for Public Input

The ability to evacuate the hyperbaric facility does not belong in the section on chamber ventilation. It should be promoted to its own section. The requirements for the timed evacuation drill belong under 14.3.1.4.5, which is the requirement to perform emergency procedures at least annually.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 240-NFPA 99-2015 [Sections 14.3.1.4.4, 14.3.1.4.5]	

Submitter Information Verification

Submitter Full Name: ROBERT SHEFFIELD
Organization: INTERNATIONAL ATMO INC
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 24 12:01:33 EDT 2015

Committee Statement

Resolution: FR-314-NFPA 99-2015
Statement: The ability to evacuate the hyperbaric facility does not belong in the section on chamber ventilation. It should be promoted to its own section.

The requirements for the timed evacuation drill belong under 14.3.1.4.5, which is the requirement to perform emergency procedures at least annually. See FR 313.

Public Input No. 318-NFPA 99-2015 [Section No. 14.2.4.5]

14.2.4.5 Emergency Depressurization ~~and Facility Evacuation Capability~~ .

14.2.4.5.1

Class A chambers shall be capable of depressurizing from 3 ATA (304.0 kPa) to ambient pressure in not more than 6 minutes.

14.2.4.5.2

Class B chambers shall be capable of depressurizing from 3 ATA (304.0 kPa) to ambient pressure in not more than 2 minutes.

14.2.4.5.3*

A means for respiratory and eye protection from combustion products allowing unrestricted mobility shall be available outside a Class A or Class B chamber for use by personnel in the event the air in the vicinity of the chamber is fouled by smoke or other combustion products.

14.2.4.5.4

The time required to evacuate all persons from a hyperbaric area with a full complement of chamber occupants all at treatment pressure shall be measured annually during the fire training drill required by 14.3.1.4.5.

14.2.4.5.4.1

The occupants for this training drill shall be permitted to be simulated.

Statement of Problem and Substantiation for Public Input

Move facility evacuation to Rules and regulations

Submitter Information Verification

Submitter Full Name: JAMES BELL
Organization: INTERMOUNTAIN HEALTHCARE
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jul 02 15:51:12 EDT 2015

Committee Statement

Resolution: FR-314-NFPA 99-2015
Statement: The ability to evacuate the hyperbaric facility does not belong in the section on chamber ventilation. It should be promoted to its own section.

The requirements for the timed evacuation drill belong under 14.3.1.4.5, which is the requirement to perform emergency procedures at least annually. See FR 313.

Public Input No. 311-NFPA 99-2015 [Section No. 14.2.4.5.3]

14.2.4.5.3 * –

~~A means for respiratory and eye protection from combustion products allowing unrestricted mobility~~

A breathing apparatus, with sufficient mobility, shall be available outside a

~~Class A or Class B~~

hyperbaric chamber for use by personnel in the event the air in the vicinity of the chamber is fouled by smoke or other combustion products. It shall provide both breathing grade air and eye protection for a duration sufficient to ascend the chamber from its maximum operating pressure and evacuate all occupants and staff to a safe location. The number of breathing apparatus and their design shall be approved by the Hyperbaric Safety Director.

Statement of Problem and Substantiation for Public Input

Removes the ability to use a smoke hood with integral filter/air supply, or similar technology as a primary means of safe breathing air for staff. Adds a needed duration of operation capability requirement for the breathing apparatus.

Respectfully submitted by:
William Davison, CHT (colorado@oxyheal.com)
Gregory Raleigh, CHT, RCP (raleigh.g@earthlink.net)

Submitter Information Verification

Submitter Full Name: WILLIAM DAVISON
Organization: OxyHeal Health Group
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jul 01 16:46:31 EDT 2015

Committee Statement

Resolution: The current language gives the end user flexibility to determine the best means to be provided for the specific situation. This is too limiting to require something with an air source in all instances. There is nothing in this paragraph that would not allow a person to provide a full air source. Designers and safety users can determine the appropriate protection depending on the specifics of their facility. The current annex note for this section covers this in some detail.

Public Input No. 317-NFPA 99-2015 [Section No. 14.2.4.5.3]

14.2 3 .1. 4.5.3*

A means for respiratory and eye protection from combustion products allowing unrestricted mobility shall be available outside a Class A or Class B chamber for use by personnel in the event the air in the vicinity of the chamber is fouled by smoke or other combustion products.

Statement of Problem and Substantiation for Public Input

Consider moving this to Rules and regulations as it is not a design feature of the chamber system

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 250-NFPA 99-2015 [Section No. 14.2.4.5.4]	

Submitter Information Verification

Submitter Full Name: JAMES BELL
Organization: INTERMOUNTAIN HEALTHCARE
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jul 02 15:47:58 EDT 2015

Committee Statement

Resolution: FR-314-NFPA 99-2015
Statement: The ability to evacuate the hyperbaric facility does not belong in the section on chamber ventilation. It should be promoted to its own section.

The requirements for the timed evacuation drill belong under 14.3.1.4.5, which is the requirement to perform emergency procedures at least annually. See FR 313.

Public Input No. 250-NFPA 99-2015 [Section No. 14.2.4.5.4]

14. ~~2~~ 3 . 1. 4.5. ~~4~~ 1

The time required to evacuate all persons from a hyperbaric area with a full complement of chamber occupants all at treatment pressure shall be measured annually during the fire training drill required by 14.3.1.4.5.

14. ~~2~~ 3 . 1. 4.5. ~~4.1~~ 2

The occupants for this training drill shall be permitted to be simulated.

Statement of Problem and Substantiation for Public Input

These requirments deal with administration, moving them into 14.3. adds clarity and less flipping back and forth between the pages.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 317-NFPA 99-2015 [Section No. 14.2.4.5.3]	

Submitter Information Verification

Submitter Full Name: JAMES BELL
Organization: INTERMOUNTAIN HEALTHCARE
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jun 28 10:41:54 EDT 2015

Committee Statement

Resolution: FR-313-NFPA 99-2015
Statement: Requirements related to emergency procedures have been relocated to a new section titled "Emergency Procedures". Surveys have shown that compliance with conducting emergency drills is poor. Creating the new section adds emphasis to these requirements.

Two requirements on emergency drills previously located in 14.2.4 (chamber ventilation) have been moved to this new section.

Public Input No. 223-NFPA 99-2015 [New Section after 14.2.5.3]

New sections to Fire Protection in Class A Chambers

14.2.5.2.9 NEW All dedicated storage vessels used to provide the deluge system with water shall be fitted with a suitable water level indicator, with the level displayed at the chamber console.

14.2.5.2.10 NEW Deluge systems using pressurized water vessels shall be designed to prevent the driving gas supply from pressurizing the hyperbaric chamber if all the water is driven out of the water vessel.

-

-

Statement of Problem and Substantiation for Public Input

14.2.5.2.9 offered to ensure that the chamber operator has assurance that the deluge vessels are indeed filled with water prior to treatments commencing. Of course this does not do away with the requirements for daily visual checks nor semi-annual testing.

14.2.5.2.10 Offered to prevent excessive driving gas from adding pressure to the chamber. One solution might be a residual pressure device on the driving gas cylinder (shuts off when pressure reaches a certain minimum level, but then this would make cylinder change-out potentially restricted. Refilling is always difficult with a residual pressure device.
A bladder or 'bag" which contains the water is one option, with the gas squeezing the bag, but not actually leaving the deluge vessel.

Submitter Information Verification

Submitter Full Name: FRANCOIS BURMAN
Organization: DIVERS ALERT NETWORK
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 23 14:25:00 EDT 2015

Committee Statement

Resolution: FR-315-NFPA 99-2015

Statement: Section 14.2.5.2.9 has been added to ensure that the chamber operator has assurance that the deluge vessels are indeed filled with water prior to treatments commencing. This does not do away with the requirements for daily visual checks nor semi-annual testing.

Section 14.2.5.2.10 has been added to prevent excessive driving gas from adding pressure to the chamber. One solution might be a residual pressure device on the driving gas cylinder (shuts off when pressure reaches a certain minimum level, but then this would make cylinder change-out potentially restricted. Refilling is always difficult with a residual pressure device.

Public Input No. 256-NFPA 99-2015 [Section No. 14.2.5.5]

14.2 3 ~~.5.5~~ 7.x.x. * Testing.

The deluge and handline systems shall be functionally tested at least semiannually per 14.2.5.2.7 for deluge systems and 14.2.5.3.7 for handline systems.

14.2.5.5.1

Following the test, all valves shall be placed in their baseline position.

14.2.5.5.2

If a bypass system is used, it shall not remain in the test mode after completion of the test.

14.2.5.5.3

During initial construction, or whenever changes are made to the installed deluge system that will affect the spray pattern, testing of spray coverage to demonstrate conformance to the requirements of 14.2.5.2.6 shall be performed at surface pressure and at maximum operating pressure.

14.2.5.5.3.1

The requirements of 14.2.5.2.6 shall be satisfied under both surface pressure and maximum operating pressure.

14.2.5.5.4

A detailed record of the test results shall be maintained and a copy sent to the hyperbaric facility safety director.

14.2.5.5.5

Inspection, testing, and maintenance of hyperbaric fire suppression systems shall be performed by a qualified person.

Statement of Problem and Substantiation for Public Input

Create one section for all ITM requirements in our chapter

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 252-NFPA 99-2015 [Section No. 14.3.6.3]	fire suppression

Submitter Information Verification

Submitter Full Name: JAMES BELL
Organization: INTERMOUNTAIN HEALTHCARE
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jun 28 13:59:32 EDT 2015

Committee Statement

Resolution: FR-340-NFPA 99-2015
Statement: This revision is intended to compile all ITM requirements in one location. This includes relocating the provisions previously located in 14.2.5.5 and 14.2.9.6.1.

Public Input No. 494-NFPA 99-2015 [New Section after 14.2.7.2]

A.14.2.7.2
The fire alarm signaling device may be a pull station, phone, intercom, or like device.

Statement of Problem and Substantiation for Public Input

The current wording of "fire alarm signaling device" is being read as "a pull-station" by many AHJs. An Annex note or definition in chapter 3 may resolve this issue.

Submitter Information Verification

Submitter Full Name: RICHARD BARRY
Organization: HEALOGICS
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 16:37:44 EDT 2015

Committee Statement

Resolution: FR-316-NFPA 99-2015
Statement: This revision intends to clarify that it is not the intent that the presence of the hyperbaric chamber(s) to require the installation of a fire alarm system. A telephone to notify the fire department can be sufficient. If a fire alarm is available, there must be a direct connection by means of a pull station as a signalling device.

Public Input No. 224-NFPA 99-2015 [Section No. 14.2.8.1.3]

14.2.8.1.3

Console or module spaces located either outside or inside the chamber and containing both oxygen piping and electrical equipment shall be either one of the following:

(1) Mechanically or naturally ventilated

(2) Continuously monitored for excessive oxygen concentrations whenever the electrical equipment is energized

Statement of Problem and Substantiation for Public Input

There is no clarity whether this applies to inside or outside the chamber.

Submitter Information Verification

Submitter Full Name: FRANCOIS BURMAN
Organization: DIVERS ALERT NETWORK
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 23 14:34:37 EDT 2015

Committee Statement

Resolution: The proposed language does not in fact provide added clarity. As written, the phrasing applies to all console or modular places, the only locations could possibly be outside or inside. It already applies to both.

Public Input No. 257-NFPA 99-2015 [Section No. 14.2.8.1.4.1]

14.2.8.1.4.1 *

If motors for the operation of the chamber are to be located ~~in~~ iniside the chamber, they shall meet the requirements of 14.2.8.3.14.

Statement of Problem and Substantiation for Public Input

There has been confusion between motors for operation of the chamber and motors in patient care equipment. Patient care equipment is 99 chapter 10 (14.2.8.1.5, hopefully this language will help clarify.

Submitter Information Verification

Submitter Full Name: JAMES BELL
Organization: INTERMOUNTAIN HEALTHCARE
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jun 28 14:03:04 EDT 2015

Committee Statement

Resolution: FR-320-NFPA 99-2015
Statement: This section is redundant with 14.2.8.3.14 for class A chambers. Motors should not be permitted within Class B chambers.

Public Input No. 324-NFPA 99-2015 [Section No. 14.2.8.2]

14.2.8.2 Electrical Service.

14.2.8.2.1 –

All hyperbaric facilities shall

~~contain an electrical service that is supplied from two independent sources of electric power.~~

have some means of backup electric power for the following electrically driven features:

(1) Chamber room emergency lighting

(2) Chamber emergency lighting, whether internally or externally mounted

(3) Chamber intercommunications

(4) Alarm systems, including fire detectors

(5) Chamber fire suppression system equipment and controls

(6) Electrical controls used for chamber pressurization and ventilation control

14.2.8.2.1.1

Electrical control and alarm system design shall be such that hazardous conditions (e.g., loss of chamber pressure control, deluge activation, spurious alarms) do not occur during power interruption or during power restoration.

14.2.8.2.1. ~~1~~ –

~~All hyperbaric facilities for human occupancies shall contain an electrical service that is~~

2

Booster pumps in the chamber fire suppression system shall be on separate branch circuits serving no other loads.

14.2.8.2.2

Article 700 of NFPA 70, National Electrical Code, shall apply to hyperbaric systems located in facilities other than health care facilities.

14.2.8.2.3

Hyperbaric electrical service for Category 1 or 2 Care shall be supplied from two independent sources of electric power.

14.2.8.2. ~~1~~

3 .

~~2~~ –

1

For hyperbaric facilities using a prime-mover-driven generator set, it shall be designated as the life safety and critical branches and shall meet the requirements of Chapter 6 for hyperbaric systems based in health care facilities.

14.2.8.2.

~~1.~~

3

–

~~Article 700 of *NFPA 70* , *National Electrical Code* , shall apply to hyperbaric systems located in facilities other than health care facilities.~~

~~14.2.8.2.2~~ –

~~14.2.8.2.3~~ –

.2

Electrical equipment associated with life-support functions of hyperbaric facilities shall be connected to the critical branch of the life safety and critical branches, which requires that such equipment shall have electrical power restored within 10 seconds of interruption of normal power.

14.2.8.2. ~~2~~

3 .

~~1~~ –

~~The equipment specified in 14.2.8.2.2 shall include, but is not limited to, the following:~~

(1) ~~- Electrical power outlets located within the chamber~~

(2) ~~- Chamber emergency lighting, whether internally or externally mounted~~

(3) ~~- Chamber intercommunications~~

(4) ~~- Alarm systems, including fire detectors~~

(5) ~~- Chamber fire suppression system equipment and controls~~

(6) ~~- Other electrical controls used for chamber pressurization and ventilation control~~

(7) ~~- A sufficient number of chamber room lights (either overhead or local) to ensure continued safe operation of the facility during a normal power outage~~

~~14.2.8.2.2.2~~ –

~~Booster pumps in the chamber fire suppression system shall be on separate branch circuits serving no other loads.~~

3

Electric motor–driven compressors and auxiliary electrical equipment normally located outside the chamber and used for chamber atmospheric control shall be connected to the equipment system (see Chapter 6) or the life safety and critical branches (see NFPA 70 , National Electrical Code , Article 700) , as applicable.

14.2.8.2. ~~4~~ –

3.4

Electric motor–driven compressors and auxiliary electrical equipment shall be arranged for delayed-automatic or manual connection to the alternate power source so as to prevent excessive current draw on the system during restarting.

14.2.8.2.

~~5~~ –

3.5

When reserve air tanks or a nonelectric compressor(s) is provided to maintain ventilation airflow within the chamber and supply air for chamber pressurization, the compressor(s) and auxiliary equipment shall not be required to have an alternate source of power.

~~14.2.8.2.6~~ –

~~Electrical control and alarm system design shall be such that hazardous conditions (e.g., loss of chamber pressure control, deluge activation, spurious alarms) do not occur during power interruption or during power restoration.~~

Statement of Problem and Substantiation for Public Input

Some hyperbaric facilities do not need two independent sources of electrical power. Example: a pneumatically driven monoplace chamber where ancillary critical care equipment is never used. The requirements of this section are modified to identify specific features of all hyperbaric facilities that should have back up electric power, and to allow for hyperbaric facilities with less elaborate backup power needs.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 323-NFPA 99-2015 [Section No. 14.1.3]	The changes are related

Submitter Information Verification

Submitter Full Name: ROBERT SHEFFIELD
Organization: INTERNATIONAL ATMO INC
Street Address:

City:

State:

Zip:

Submittal Date: Thu Jul 02 18:16:08 EDT 2015

Committee Statement

Resolution: FR-304-NFPA 99-2015

Statement: The requirements of this section are modified to identify specific features of all hyperbaric facilities that should have back up electric power, and to allow for hyperbaric facilities with less elaborate backup power needs. Some hyperbaric facilities do not need two independent sources of electrical power. Example: a pneumatically driven monoplace chamber where ancillary critical care equipment is never used.

Public Input No. 408-NFPA 99-2015 [Section No. 14.2.8.2.1 [Excluding any Sub-Sections]]

All hyperbaric ~~facilities shall~~ facilities that provide Category 1 Care per 14.1.3.1 shall contain an electrical service that is supplied from two independent sources of electric power.

Statement of Problem and Substantiation for Public Input

By stating which Category of Care is required to have two independent sources of electrical power we can eliminate the need for a generator at a non-emergent location. In its current state it is not uncommon for AHJs to require a generator for chambers that operator by gas pressure versus electrical power.

Submitter Information Verification

Submitter Full Name: RICHARD BARRY
Organization: HEALOGICS
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jul 05 21:40:34 EDT 2015

Committee Statement

Resolution: FR-304-NFPA 99-2015
Statement: The requirements of this section are modified to identify specific features of all hyperbaric facilities that should have back up electric power, and to allow for hyperbaric facilities with less elaborate backup power needs. Some hyperbaric facilities do not need two independent sources of electrical power. Example: a pneumatically driven monoplace chamber where ancillary critical care equipment is never used.

Public Input No. 248-NFPA 99-2015 [Section No. 14.2.8.2.1.1]

~~14.2.8.2.1.1~~ –

~~All hyperbaric facilities for human occupancies shall contain an electrical service that is supplied from two independent sources of electric power.~~

Statement of Problem and Substantiation for Public Input

Paragraph 14.2.8.2.1.1 is a duplication of the superordinate paragraph immediately preceding it. It is repetitive and unnecessary.

Submitter Information Verification

Submitter Full Name: ROBERT SHEFFIELD
Organization: INTERNATIONAL ATMO INC
Street Address:
City:
State:
Zip:
Submittal Date: Fri Jun 26 10:23:52 EDT 2015

Committee Statement

Resolution: FR-304-NFPA 99-2015

Statement: The requirements of this section are modified to identify specific features of all hyperbaric facilities that should have back up electric power, and to allow for hyperbaric facilities with less elaborate backup power needs. Some hyperbaric facilities do not need two independent sources of electrical power. Example: a pneumatically driven monoplace chamber where ancillary critical care equipment is never used.

Public Input No. 409-NFPA 99-2015 [Section No. 14.2.8.2.1.1]

14.2.8.2.1.1

All hyperbaric facilities that provide Category 1 Care per 14.1.3.1 for human occupancies shall contain an electrical service that is supplied from two independent sources of electric power.

Statement of Problem and Substantiation for Public Input

Same substantiation as PI 408.

Submitter Information Verification

Submitter Full Name: RICHARD BARRY
Organization: HEALOGICS
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jul 05 21:48:35 EDT 2015

Committee Statement

Resolution: The idea that the submitter is trying to accomplish has been addressed in the revisions to Section 14.2.8.2.

Public Input No. 225-NFPA 99-2015 [Section No. 14.2.8.3.9 [Excluding any Sub-Sections]]

Flexible cords used to connect portable utilization equipment to the fixed electrical supply circuit shall meet all of the following requirements:

(1) They shall be of a type approved for extra-hard utilization in accordance with Table 400.4 of *NFPA 70*, *National Electrical Code*.

(2) They shall include a ground conductor *.

(3) They shall meet the requirements of 501.140 of *NFPA 70*, *National Electrical Code*.

* Electrically-conductive casings of all portable equipment for use inside the chamber shall be grounded. Non-conductive casings for portable equipment supplied from a low voltage DC supply system do not require a ground conductor.

Statement of Problem and Substantiation for Public Input

AC devices (110 VAC) are generally supplied with a ground conductor within the flexible electrical cord. VDC devices are generally supplied from ungrounded power supplies. Is the intention to ensure that all portable equipment for use inside the chamber should have a ground conductor?
Par. 14.2.8.3.7.2 requires that "a continuous ground shall be maintained between all conductive surfaces enclosing electrical circuits and the chamber hull using approved grounding means." A VDC powered device generally does not possess any grounding facilities.
Should one therefore either specify that:
(1) All VAC devices shall include a ground conductor, or
(2) That the electrically conductive casings of all electrical portable equipment used inside the chamber shall be grounded?

This could be addressed using the additional text marked *. We are trying to avoid adding a separate grounding wire that cannot in reality be connected to any part of the equipment housing and that will require special splicing to fit into the electrical connector (assuming we have a dedicated connector rather than a junction box inside the chamber).
Grounding a VDC conductive casing will, however, prevent the accumulation of static charges.

Submitter Information Verification

Submitter Full Name: FRANCOIS BURMAN
Organization: DIVERS ALERT NETWORK
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 23 14:37:31 EDT 2015

Committee Statement

Resolution: FR-327-NFPA 99-2015

Statement: AC devices (110 VAC) are generally supplied with a ground conductor within the flexible electrical cord. VDC devices are generally supplied from ungrounded power supplies. Section 14.2.8.3.7.2 requires that "a continuous ground shall be maintained between all conductive surfaces enclosing electrical circuits and the chamber hull using approved grounding means." A VDC powered device generally does not possess any grounding facilities.

Public Input No. 258-NFPA 99-2015 [Section No. 14.2.8.3.14]

14.2.8.3.14 Motors.

Motors for the operation of the chamber shall meet one of the following requirements:

(1) They shall comply with 501.125(A)(1) of *NFPA 70*, *National Electrical Code*, ~~for the chamber pressure and oxygen concentration.~~

(2) They shall be of the totally enclosed types meeting 501.125(A)(2) or 501.125(A)(3) of *NFPA 70*, *National Electrical Code*.

Statement of Problem and Substantiation for Public Input

There has been confusion regarding how to apply the code for motors for chamber operation and patient care equipment

Consider removing the chamber pressure and O2 concentration language as this is not enforceable

Submitter Information Verification

Submitter Full Name: JAMES BELL
Organization: INTERMOUNTAIN HEALTHCARE
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jun 28 14:09:40 EDT 2015

Committee Statement

Resolution: FR-321-NFPA 99-2015
Statement: There has been confusion regarding how to apply the code for motors for chamber operation and patient care equipment

Public Input No. 259-NFPA 99-2015 [Section No. 14.2.8.3.15.1]

14.2.8.3.15.1

Lighting installed or used inside the chamber shall ~~be rated for a pressure of 1~~ 1 beof a type that is not damaged by exposure to pressure, 1 1/2 times the chamber operating pressure.

Statement of Problem and Substantiation for Public Input

Using the word rated is problematic as there are not any lighting fixtures rated for our application

Submitter Information Verification

Submitter Full Name: JAMES BELL
Organization: INTERMOUNTAIN HEALTHCARE
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jun 28 14:13:21 EDT 2015

Committee Statement

Resolution: FR-322-NFPA 99-2015
Statement: Using the word rated is problematic as there are not any lighting fixtures rated for our application

Public Input No. 260-NFPA 99-2015 [Section No. 14.2.8.3.17.1]

14.2.8.3.17.1

The appliance shall be designed,constructed, inspected and ~~constructed~~ maintained in accordance with Chapter 10.

Statement of Problem and Substantiation for Public Input

This helps clarify the intent of this section regarding patient care manufacture, ITM of patient care equipment.

Submitter Information Verification

Submitter Full Name: JAMES BELL
Organization: INTERMOUNTAIN HEALTHCARE
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jun 28 14:15:54 EDT 2015

Committee Statement

Resolution: FR-323-NFPA 99-2015
Statement: This helps clarify the intent of this section regarding patient care manufacture, ITM of patient care equipment.

Public Input No. 263-NFPA 99-2015 [Section No. 14.2.8.3.17.5]

14.2.8.3.17.5 Battery-Operated Devices.

Battery-operated devices shall meet the following requirements:

(1) Batteries shall be fully enclosed and secured within the equipment enclosure.

(2) Batteries shall not be damaged by the maximum chamber pressure to which they are exposed.

(3) Batteries shall be of a sealed type that does not off-gas during normal use.

(4) Batteries or battery-operated equipment shall not undergo charging while located in the chamber.

(5) Batteries shall not be changed on in-chamber equipment while the chamber is in use.

(6) The equipment electrical rating shall not exceed 12 V and 48 W.

(7) ~~Lithium and lithium ion batteries shall be prohibited in the chamber during chamber operations, unless the product has been accepted or listed for use in hyperbaric conditions by the manufacturer or a nationally recognized testing agency.~~

(8)

Additional Proposed Changes

File Name	Description	Approved
FAA_airline_passengers_and_batteries.pdf		
Lithium-Ion_Batteries_WP.pdf	UL information regarding lithium bateries	

Statement of Problem and Substantiation for Public Input

The HEA/HYP acted correctly in prohibiting lithium and lithium ion batteries. These batteries do present a particular hazard as compared to other batteries when a fire occurs. The prohibition has allowed us time to process and investigate. Battery technology and manufacturing process has improved. It is time for a change.
Consider striking the entire number 7
14.2.8.3.1, 14.8.3.2, 14.2.8.3.3, 14.2.8.3.4, 14.2.8.3.12 and 14.2.8.3.17 would still be in effect
14.3.1.5.1.2 Would still be in effect prohibiting cell phones and personal electronic devices
14.2.8.1.5 requires us to use chapter 10 for patient care equipment so these devices are part of a PM program
The existing protections in chapter 14 exceed the FAA guidelines for carry-on baggage.
The provision for manufactures to approve or third party testing is not functional and does not work.
The FAA and NASA have the most experience with issues related to pressure changes with these types of batteries and the FAA has developed rules for carry-on baggage and cargo. We should consider allowing a limited quantity of lithium and lithium ion batteries for essential equipment. Cells phone, and personal electronic devices would still be prohibited, temperature limits, only required equipment for chamber operation or patient care and a preventive maintenance program are all in place for the class A chamber. Our chapter 14 requirements would still be more conservative than the FAA regulations for carry on baggage.

1. Primary lithium batteries should be allowed using the same terms as any other battery in the chamber.
Personal experience inside the class A chamber over the last 20 years with primary batteries (non-rechargeable) in the hands free sink, IV pumps for the memory and clock function, and vacuum regulators in hyper and hypobaric conditions with no incidents. UL abuse standard exposes the batteries to a pressure test of 2000 pounds. Clinical pressures are less than 10% of this test.
2. Secondary batteries (rechargeable) should be allowed using the existing requirements. There are devices with recharge able lithium batteries that have been approved for hyperbaric chambers such as the Hyox portable defibrillator. Literature search indicates that LVAD batteries have been taken into the chamber safely. Personal communications (unpublished) with other users indicate continued use of equipment powered by rechargeable battery packs in class A chambers before and after the prohibition was added with no mishaps.
Lithium ion batteries do burn explosively when crushed short circuited, overheated or damaged. These conditions are unlikely in the controlled environment of the class A chamber.
The reported incidents that have occurred have been related to battery charging, large volume shipments, loose batteries shorting out, overheating caused by mixed batteries, exposure to high temperature, etc. There have been no documented cases of fires I am aware of from primary or secondary lithium or lithium ion batteries that are not charging, contained within the devise as designed, part of a required preventive maintenance program and not exposed to heat.
Annex material could consider the lithium ion concern and suggest inert gas purging and temperature monitoring.
Consider language allowing intrinsically safe batteries
Consider that there have been fires from other types of batteries when stored or used incorrectly.

Submitter Information Verification

Submitter Full Name: JAMES BELL
Organization: INTERMOUNTAIN HEALTHCARE
Street Address:
City:

State:

Zip:

Submittal Date: Sun Jun 28 14:27:34 EDT 2015

Committee Statement

Resolution: FR-324-NFPA 99-2015

Statement: The existing provision for manufactures to approve or third party testing is not functional and does not work. While this revision deletes the prohibition of lithium and lithium ion batteries, other protection are in place. See sections 14.2.8.3.1, 14.8.3.2, 14.2.8.3.3, 14.2.8.3.4, 14.2.8.3.12 and 14.2.8.3.17 for example.

Section 14.3.1.5.1.2 Would still be in effect prohibiting cell phones and personal electronic devices.

Section 14.2.8.1.5 requires us to use chapter 10 for patient care equipment so these devices are part of a PM program.

The existing protections in chapter 14 exceed the FAA guidelines for carry-on baggage.

The FAA and NASA have the most experience with issues related to pressure changes with these types of batteries and the FAA has developed rules for carry-on baggage and cargo. This revision will allow a limited quantity of lithium and lithium ion batteries for essential equipment. Cells phone, and personal electronic devices would still be prohibited, temperature limits, only required equipment for chamber operation or patient care and a preventive maintenance program are all in place for the class A chamber. Chapter 14 requirements would still be more conservative than the FAA regulations for carry on baggage.

UL abuse standard exposes the batteries to a pressure test of 2000 pounds. Clinical pressures are less than 10% of this test.

Secondary batteries (rechargeable) should be allowed using the existing requirements. There are devices with rechargeable lithium batteries that have been approved for hyperbaric chambers. Literature search indicates that LVAD batteries have been taken into the chamber safely.

The reported incidents that have occurred have been related to battery charging, large volume shipments, loose batteries shorting out, overheating caused by mixed batteries, exposure to high temperature, etc. There have been no documented cases of fires that the committee is aware of from primary or secondary lithium or lithium ion batteries that are not charging, contained within the device as designed, part of a required preventive maintenance program and not exposed to heat.

Public Input No. 49-NFPA 99-2015 [Section No. 14.2.8.3.17.5]

14.2.8.3.17.5 Battery-Operated Devices.

Battery-operated devices shall meet the following requirements:

(a) Batteries shall be fully enclosed and secured within the equipment enclosure.

(b) Batteries shall not be damaged by the maximum chamber pressure to which they are exposed.

(c) Batteries shall be of a sealed type that does not off-gas during normal use.

(d) Batteries or battery-operated equipment shall not undergo charging while located in the chamber.

(e) Batteries shall not be changed on in-chamber equipment while the chamber is in use.

(f) The equipment electrical rating shall not exceed 12 V and 48 W.

(g) The use of Lithium and lithium ion batteries shall be prohibited in the chamber during chamber operations, unless the product has been accepted or listed for use in hyperbaric conditions by the manufacturer

~~or~~

, a nationally recognized testing agency , or has been subjected to a risk analysis conducted by a qualified person and approved by the Safety Director, or the manufacturer .

Additional Proposed Changes

File Name	Description	Approved
PC_26_HYP.pdf	NFPA 99_PC26	

Statement of Problem and Substantiation for Public Input

NOTE: The following Public Input appeared as “Reject but Hold” in Public Comment No. 26 of the (A2014) Second Draft Report for NFPA 99 and per the Regs. At 4.4.8.3.1.
The committee, in my opinion, acted correctly prohibiting Lithium ion batteries in the chamber. There is currently no test of pressure applied to these types of batteries and the risk of fire from a failure of the battery is higher than a similar sized battery.The technology surrounding Lithium Ion batteries is changing rapidly. There does not seem to be any standard test we could apply to batteries that would insure safety. To "just say no" does not seem appropriate either. It is a matter of energy density or potential, pressure the battery is exposed to, type of battery and proximity to an atmosphere of increased oxygen partial pressure. A hearing aid battery inside brass housing for hands free sink tap operation is much different to a hearing aid battery inside an ear in an Oxygen hood or a large rechargeable battery pack. As technology changes so will the risk. We need flexibility now and in the future and risk mitigation is an auditable way forward.

Submitter Information Verification

Submitter Full Name: TC ON HEA-HYP
Organization: NFPA
Street Address:
City:
State:
Zip:
Submittal Date: Thu Apr 09 14:28:49 EDT 2015

Committee Statement

Resolution: FR-324-NFPA 99-2015

Statement: The existing provision for manufactures to approve or third party testing is not functional and does not work. While this revision deletes the prohibition of lithium and lithium ion batteries, other protection are in place. See sections 14.2.8.3.1, 14.8.3.2, 14.2.8.3.3, 14.2.8.3.4, 14.2.8.3.12 and 14.2.8.3.17 for example.

Section 14.3.1.5.1.2 Would still be in effect prohibiting cell phones and personal electronic devices.

Section 14.2.8.1.5 requires us to use chapter 10 for patient care equipment so these devices are part of a PM program.

The existing protections in chapter 14 exceed the FAA guidelines for carry-on baggage.

The FAA and NASA have the most experience with issues related to pressure changes with these types of batteries and the FAA has developed rules for carry-on baggage and cargo. This revision will allow a limited quantity of lithium and lithium ion batteries for essential equipment. Cells phone, and personal electronic devices would still be prohibited, temperature limits,

only required equipment for chamber operation or patient care and a preventive maintenance program are all in place for the class A chamber. Chapter 14 requirements would still be more conservative than the FAA regulations for carry on baggage.

UL abuse standard exposes the batteries to a pressure test of 2000 pounds. Clinical pressures are less than 10% of this test.

Secondary batteries (rechargeable) should be allowed using the existing requirements. There are devices with rechargeable lithium batteries that have been approved for hyperbaric chambers. Literature search indicates that LVAD batteries have been taken into the chamber safely.

The reported incidents that have occurred have been related to battery charging, large volume shipments, loose batteries shorting out, overheating caused by mixed batteries, exposure to high temperature, etc. There have been no documented cases of fires that the committee is aware of from primary or secondary lithium or lithium ion batteries that are not charging, contained within the device as designed, part of a required preventive maintenance program and not exposed to heat.

Public Input No. 346-NFPA 99-2015 [New Section after 14.2.8.3.17.6]

Inert Gas Purging of Electrical Devices

14.2.8.3.18 Inert Gas Purging

14.2.8.3.18.1*

Unless specifically cleared by the manufacturer for HBO use, or declared safe for use in an oxygen enriched environment, all AC and DC equipment used inside the chamber shall be inert gas purged. Exceptions would include small low voltage battery powered devices with no more than two (2) 1.5 VDC batteries and the device is not rechargeable. Note: Additional safe practice guidelines for inert gas purging are listed in Annex B under B14.2.8.3.17.7 Inert Gas Purging.

14.2.8.3.18.2*

Where inert gas purging is used, the following shall apply.

(1) Each electrical device shall comply with section 14.2.8.3.19.

(2) Each inert gas purged device shall have its own dedicated purging line and flowmeter with each flowmeter clearly labled with the common CGA inert gas name.

(3) Oxygen percent shall be maintained at less than or equal to 6 percent within the electrical compartment(s) of the device at all treatment levels.

(4) The manufacturer's safe operating temperature range shall be maintained at all treatment levels.

(5) Supply pressure for inert gas purging shall be supplied from a regulator system that will maintain the surface pressure over the chamber's treatment pressure, or over-bottom pressure.

(6) An audio and visual alarm system shall activate at the operator's console if there is a loss of sufficient pressure to maintain set flowrates to the inert gas purging system during any pressurization of the chamber.

(7) Chamber operations shall be aborted if there is a loss of sufficient pressure to the inert gas purging system as noted in (6).

(8) Oxygen monitoring of the chamber's atmosphere shall have a low level alarm limit set at no lower than 18 percent.

(9) Electrical devices that are enclosed, such as TV monitors placed in acrylic boxes, shall have some means of extinguishing the device with water from the deluge system or the hand held hose.

(10) Chambers with inert gas purging systems shall keep the chamber doors open during non-operational hours.

Statement of Problem and Substantiation for Public Input

Currently chapter 14 has only one mention of inert gas purging with no minimal requirements or guidelines listed in chapter 14 or the Annexes. This additional section is an attempt to introduce some minimal requirements and further safe practice guidelines in Annex B. The standard for allowable oxygen percentage in a purged device is stated in the notes of Annex B Table B.14.4 "Pressure Table" stating that "However, 6 percent oxygen in nitrogen will not support combustion, regardless of oxygen partial pressure".

Introducing an electrical device inside a chamber increases the risk of fire as stated in 14.2.8.3*. This is true even if the device is less than 120 VAC and under 2 amps. I would petition that this risk also applies to DC devices as well as all corded and cordless devices except as mentioned in 14.2.8.3.18.1.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 345-NFPA 99-2015 [Section No. 14.2.8.3.17.6]	
Public Input No. 347-NFPA 99-2015 [New Section after A.14.2.8.3.17]	
Public Input No. 454-NFPA 99-2015 [New Section after 14.2.8.3.17.6]	

Submitter Information Verification

Submitter Full Name: WILLIAM GOSSETT
Organization: CONVERGENT, LLC
Street Address:
City:
State:
Zip:
Submittal Date: Sat Jul 04 15:16:19 EDT 2015

Committee Statement

Resolution: FR-325-NFPA 99-2015

Statement: Currently chapter 14 has only one mention of inert gas purging with no minimal requirements or guidelines listed in chapter 14 or the Annexes. This additional section is an attempt to introduce some minimal requirements and further safe practice guidelines in Annex B. The standard for allowable oxygen percentage in a purged device is stated in the notes of Annex B Table B.14.4 "Pressure Table" stating that "However, 6 percent oxygen in nitrogen will not support combustion, regardless of oxygen partial pressure".

Introducing an electrical device inside a chamber increases the risk of fire as stated in 14.2.8.3*. This is true even if the device is less than 120 VAC and under 2 amps. I would petition that this risk also applies to DC devices as well as all corded and cordless devices except as mentioned in 14.2.8.3.18.1.

Public Input No. 454-NFPA 99-2015 [New Section after 14.2.8.3.17.6]

Evaluation of Electrical Devices

14.2.8.3.19 Evaluation of Electrical Devices

14.2.8.3.19.1

This section applies to all electrical devices used in a Class A chamber except as noted in 14.2.8.3.18.1

14.2.8.3.19.2

A risk assessment process shall be established with proper documentation and signatures for all electrical devices approved for use in a Class A chamber. Reference material for the risk assessment process can be found in Annex D.2.3.1

14.2.8.3.19.3

For electrical devices receiving a risk assessment the following shall apply.

(1) The safety director, working under the medical director, shall oversee and approve of developing the proper documentation for the risk assessment process.

(2) An approved risk assessment process shall be established and signed by the medical director, safety director, unit manager and by at least one administrative or organizational representative.

(3) The risk assessment process shall be reviewed and approved annually by the medical director, safety director, unit manager and by at least one administrative or organizational representative.

(4) The risk assessment process shall comply with all applicable codes of this chapter.

(5) Documentation of any risk assessment that grants approval for an electrical device to be used inside the chamber shall be signed and dated by the medical director, safety director, unit manager and a representative of each party involved with the risk assessment.

(6) Policies and procedures shall be written in such a way to ensure that all mitigation orders from the risk assessment are carried out when the approved device is used inside the chamber.

(7) The medical director, safety director and unit manager shall approve, review and sign these policies and procedures annually.

(8) Changes or modifications to the risk assessment process shall be signed as medical director, safety director, unit manager and by at least one administrative or organizational representative.

(9) Changes or modifications to the policies or procedures shall be signed by the medical director, safety director and unit manager.

(10) The medical director, safety director, unit manager and at least one administrator or organizational representative can appoint a qualified person(s) to assist the safety director in this process.

Statement of Problem and Substantiation for Public Input

This section is added to underscore the importance of risk assessment and require some type of an approved and established process. There may be a temptation to think that by applying an inert gas purge to an electrical device this is all that is needed to introduce it into the chamber.

This section is also added to share the burden of responsibility and underscore the importance of this process to all responsible parties.

The last item (10) is added because the designated safety director may not have the level of education, training and or experience needed to oversee the requirements of this section.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 346-NFPA 99-2015 [New Section after 14.2.8.3.17.6]	

Submitter Information Verification

Submitter Full Name: WILLIAM GOSSETT
Organization: CONVERGENT, LLC
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 14:28:55 EDT 2015

Committee Statement

Resolution: The proposed language offers an administrative structure for such a risk assessment but there is limited information available to guide the users of the code on the technical content of the risk assessment. Additional technical information would be welcomed in the public comment stage. In many health care facilities, the evaluation of electrical equipment is done by individuals outside of the hyperbaric operations. This material also has less value since the associated input for gas purging was not adopted into the code as proposed. The proposed language introduces a new term such as "unit manager."

Public Input No. 345-NFPA 99-2015 [Section No. 14.2.8.3.17.6]

14.2.8.3.17.6 Cord-Connected Devices.

Cord-connected devices shall meet the following requirements:

(1) All portable, cord-connected equipment shall have an on/off power switch.

(2) The ~~equipment electrical rating shall not exceed 120 V and 2 A, unless the electrical portions of the equipment are inert-gas purged.~~

(3) ~~The~~ plug of cord-connected devices shall not be used to interrupt power to the device.

Statement of Problem and Substantiation for Public Input

The additional section for inert gas purging will cover this deletion.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 346-NFPA 99-2015 [New Section after 14.2.8.3.17.6]	

Submitter Information Verification

Submitter Full Name: WILLIAM GOSSETT
Organization: CONVERGENT, LLC
Street Address:
City:
State:
Zip:
Submittal Date: Sat Jul 04 15:09:29 EDT 2015

Committee Statement

Resolution: As suggested, the removal of this section to the new section 14.2.8.3.18, would create an exception which is not in accordance with the NFPA manual of style.

Public Input No. 262-NFPA 99-2015 [Section No. 14.2.8.4]

14.2.8.4 Grounding and Ground-Fault Protection.

14.2.8.4.1

All chamber hulls shall be grounded to an electrical ground or grounding system that meets the requirements of Article 250, Grounding and Bonding, Section III, Grounding Electrode System and Grounding Electrode Conductor, of *NFPA 70*, *National Electrical Code*.

14.2.8.4.1.1

Grounding conductors shall be secured as required by Article 250, Grounding and Bonding, Section III, Grounding Electrode System and Grounding Electrode Conductor, of *NFPA 70*, *National Electrical Code*.

14.2.8.4.1.2

The material, size, and installation of the grounding conductor shall meet the requirements of Article 250, Grounding and Bonding, Section VI, Equipment Grounding and Equipment Grounding Conductors, of *NFPA 70*, *National Electrical Code*, for equipment grounding conductors.

14.2.8.4.1.3

The resistance between the grounded chamber hull and the electrical ground shall not exceed 1 ohm.

14.2.8.4. 1.5

The resistance shall be veriifed and documented as in 14.3.4 Inspection, Testing and Maintenance

14. 2.8.4.2

In health care facilities, electrical power circuits located within the chamber shall be supplied from an ungrounded electrical system equipped with a line isolation monitor with signal lamps and audible alarms.

14.2.8.4.2.1

The circuits specified in 14.2.8.4.2 shall meet the requirements of 517.160(A) and 517.160(B) of *NFPA 70*, *National Electrical Code*.

14.2.8.4.2.2

Branch circuits shall not exceed 125 V or 15 A.

14.2.8.4.3

Wiring located both inside and outside the chamber, that serves line level circuits and equipment located inside the chamber, shall meet the grounding and bonding requirements of 501.30 of *NFPA 70*, *National Electrical Code*.

Statement of Problem and Substantiation for Public Input

Add language for documentation of chamber ground in new ITM section. UHMS accreditation surveys I have been on, there are facilities that do not know if the chamber is grounded as they do not test on a regular basis.

Submitter Information Verification

Submitter Full Name: JAMES BELL
Organization: INTERMOUNTAIN HEALTHCARE
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jun 28 14:19:20 EDT 2015

Committee Statement

Resolution: This requirement will be addressed in the new ITM section.

Public Input No. 226-NFPA 99-2015 [Section No. 14.2.8.4.2 [Excluding any Sub-Sections]]

In health care facilities, V AC - electrical power circuits located within the chamber shall be supplied from an ungrounded electrical system equipped with a line isolation monitor with signal lamps and audible alarms.

Statement of Problem and Substantiation for Public Input

A line isolation monitor does not generally monitor any actual current flow, but rather it predicts what could flow should there be a low-impedance connection from either L1 or L2 to ground. These monitors are used with VAC powered systems and generally not VDC powered systems. This is confusing and reads as if ALL electrical power circuits located in the chamber shall utilise a line isolation monitor. The inserted term VAC could help clarify this.

Submitter Information Verification

Submitter Full Name: FRANCOIS BURMAN
Organization: DIVERS ALERT NETWORK
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 23 14:40:31 EDT 2015

Committee Statement

Resolution: FR-326-NFPA 99-2015
Statement: A line isolation monitor does not generally monitor any actual current flow, but rather it predicts what could flow should there be a low-impedance connection from either L1 or L2 to ground. These monitors are used with VAC powered systems and generally not VDC powered systems. This is confusing and reads as if ALL electrical power circuits located in the chamber shall utilise a line isolation monitor. The inserted term VAC could help clarify this.

The term health care facility has been removed because this should be applied regardless of the building occupancy housing the chamber.

Public Input No. 486-NFPA 99-2015 [Section No. 14.2.8.4.2 [Excluding any Sub-Sections]]

~~In health care facilities, electrical~~ Electrical power circuits located within the chamber shall be supplied from an ungrounded electrical system equipped with a line isolation monitor with signal lamps and audible alarms.

Statement of Problem and Substantiation for Public Input

The term "In Healthcare Facilities" should be removed because this code should be applied regardless of occupancy.

Submitter Information Verification

Submitter Full Name: Kevin Posey
Organization: International ATMO, Inc.
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 16:31:32 EDT 2015

Committee Statement

Resolution: FR-326-NFPA 99-2015
Statement: A line isolation monitor does not generally monitor any actual current flow, but rather it predicts what could flow should there be a low-impedance connection from either L1 or L2 to ground. These monitors are used with VAC powered systems and generally not VDC powered systems. This is confusing and reads as if ALL electrical power circuits located in the chamber shall utilise a line isolation monitor. The inserted term VAC could help clarify this.

The term health care facility has been removed because this should be applied regardless of the building occupancy housing the chamber.

Public Input No. 227-NFPA 99-2015 [New Section after 14.2.8.4.3]

Ground-Fault Circuit Interrupter

14.2.8.4.4 A Ground-Fault Circuit Interrupter (GFCI) shall be installed on each separate, grounded V_{AC} power supply system used for equipment located outside the chamber. .

Statement of Problem and Substantiation for Public Input

There is no real provision for a specified requirement on Ground-Fault Protection for grounded power supplies used outside the chamber, other than as the title in 14.2.8.4 suggests. Annex A.3.3.63 contains suitable wording for the installation of a Ground Gault Circuit Interrupter (GFCI). Our chambers are grounded to earth and are significant metallic constructions. Consider the inclusion of the requirement, which includes the updated information in UL 943 (due to be effected in July 2015).

Then, to be added to Annex A if not included here……..UL 943 Class A requires a trip threshold current (I) of 6 mA and a response time (t) according to the inverse time-current curve, $t \leq (20/I)1.43$. UL 943 Class C requirements may be considered where both grounding and double-isolation transformers are employed, with a trip threshold current increased to 20 mA. Reaction times remain as per the existing inverse time-current curve.

Question: Should we not express a preference in the Annex for the use of DC only, and to avoid using AC power inside the chamber?

In summary, concerning grounded and ungrounded power:

(1) VAC outside the chamber: grounded power connected to individual GFCI's so that the fault on one device does not render other devices inoperable.
(2) VAC inside the chamber: supplied from an isolated power supply (IPS) and fitted with a line isolation monitor (LIM). The LIM and the chamber need to be grounded, of course. No GFCI is connected to the internal parts of the chamber power supply systems.
(3) VDC inside the chamber: supplied through a suitably isolated (i.e. with an electrostatic shield between the primary and secondary windings), step-down transformer. VDC inside the chamber is not monitored by a LIM; however, it should have suitable current overload safety devices (trip switches, breakers or fuses) located outside the chamber.

Submitter Information Verification

Submitter Full Name: FRANCOIS BURMAN
Organization: DIVERS ALERT NETWORK
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 23 14:43:21 EDT 2015

Committee Statement

Resolution: It has not been demonstrated what hazard the proposed requirement for GFCI outside of the chamber is meant to address. GFCI are typically required where fluids are anticipated to be present.

Public Input No. 264-NFPA 99-2015 [Section No. 14.2.8.6.1 [Excluding any Sub-Sections]]

Electrical equipment inside Class B chambers shall be restricted to communications functions ~~and~~ , patient physiological monitoring ~~leads~~ and patient care equipment specifically designed, tested and approved for clinical hyperbaric conditions .

Additional Proposed Changes

File Name	Description	Approved
Siaretron_literature_WC.pdf		
Siaretron_Manual_2014.pdf		

Statement of Problem and Substantiation for Public Input

There is a critical lack of equipment available for patient care with hyperbaric chambers. The change in language will allow for equipment that is specifically designed, approved by the manufacturer and tested for clinical hyperbaric conditions.

The attached ventilator is an example of equipment that has been approved and in use inside class A and B chambers in Europe. FDA 501K approval is pending in the USA.

To the point, a common tool used in class B chambers is the TcpO2 electrode, while it has been tested by the manufacturer for and used in chambers for many years, the existing language does not allow it and the FDA 510K does not list hyperbaric use as one of the environmental conditions. The TcpO2 electrode is a diagnostic tool and is not used for vital signs such as BP, pulse rate etc...I suggest many of us have called the TcpO2 electrode a physiological monitoring device and suspect this is an area left to interpretation.

We need to allow language in the code for current use and future changes in technology.

Submitter Information Verification

Submitter Full Name: JAMES BELL
Organization: INTERMOUNTAIN HEALTHCARE
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jun 28 14:33:19 EDT 2015

Committee Statement

Resolution: There is not currently enough of a defined process to how this could be achieved in the US at this time. There is gap from both the FDA and testing standards that does not address this. One concern with the language as proposed is that it could open the door to medical devices that are not truly intended to be allowed in the chambers.

Public Input No. 340-NFPA 99-2015 [Section No. 14.2.9.4]

14.2.9.4 Oxygen Monitoring.

14.2.9.4.1

Oxygen levels shall be continuously monitored in any chamber in which ~~nitrogen~~ air or other diluent gas is added to compress the chamber or to reduce the volumetric concentration of oxygen in the atmosphere.

14.2.9.4.1.1

Oxygen monitors shall be equipped with audible and visual alarms.

14.2.9.4.2

Oxygen levels shall be continuously monitored in Class A chambers when breathing mixtures containing in excess of 21 percent oxygen by volume are being breathed by patients or attendants or any flammable agents are present in the chamber, or when either of these conditions exists.

14.2.9.4.2.1

Audible and visual alarms shall indicate volumetric oxygen concentrations ~~in excess of~~ that are outside of the 19 - 23.5 percent range for Class A chambers and less than 95 percent for Class B chambers .

14.2.9.4.2.2*

Oxygen levels in Class A chambers shall be sampled from at least two sample ports at disparate locations of the chamber and shall have a separate oxygen monitor for each sample port.

14.2.9.4.2.3*

Sample response time, at all treatment levels, shall be no more than 10 seconds.

14.2.9.4.2.4*

At least one sample port shall be equipped with a removable extension to allow for spot checking of any location within the chamber.

Statement of Problem and Substantiation for Public Input

14.2.9.4.1 Changing the wording from nitrogen to air is intended to increase the safety standard for chambers that can be compressed with oxygen or air. There have been incidents of inadvertent air treatments with risk of DCS to the patient. There is some concern with an adequate therapeutic level of oxygen when air is used as a diluent to decrease the oxygen level for air breaks. The recovery time can be considerable and this compromises the patient's prescribed oxygen dosing.

14.2.9.4.2.2* Site surveys (not necessarily UHMS Accreditation surveys) have shown a variety of oxygen monitoring methods that are very inadequate, such as having only one oxygen sample port in a multiplace lock full of patients. Dr. Sheffield has studied and shown the reality of oxygen pooling around patients receiving HBOT in a Class A. Requiring at least two sample ports will add some measure of increased safety in monitoring for oxygen levels that can be dangerously high around a patient(s).

Having a dedicated oxygen monitor for each line would increase the accuracy of monitoring. For example: One sample line from an area of high oxygen concentrations and the other sample from and area of 21% with both samples feeding into the same monitor will mix and result in an inaccurate measurement. Our standard is 23.5% and the oxygen monitor may be reading well below this and yet have areas of dangerous oxygen pooling. I realize that this standard does not resolve all the potential pooling issues but it does increase the standard for some measure of added safety. The Annex A asterisk was added to give additional information and understanding of the need for this requirement.

14.2.9.4.2.3 Again, site surveys have shown a variety of configurations for monitoring the chamber atmosphere. Long sample lines, with low flows, such as 0.5 LPM, will take a long time to reach the sensor head. Also, the true accuracy at those very slow rates/response times is questionable. Testing the response time is a very simple procedure and increasing this oxygen monitoring standard seems to be a simple mitigation of risk.

14.2.9.4.2.4* Oxygen pooling is a serious concern that seems to be often overlooked. This requirement would help increase the awareness of oxygen pooling and give the proper tool to troubleshoot and resolve areas of pooling. The Annex A asterisk will increase understanding and awareness. It would explain the option of leaving the wand/extension in place, if the response time is within the 10 second limits mentioned above.

Submitter Information Verification

Submitter Full Name: WILLIAM GOSSETT
Organization: CONVERGENT, LLC
Street Address:
City:

State:

Zip:

Submittal Date: Sat Jul 04 11:14:46 EDT 2015

Committee Statement

Resolution: FR-328-NFPA 99-2015

Statement: Language has been specified to make it clear that the reasoning for this requirement is specific for nitrogen and is not meant to be applied where air is used.

A minimum response time has been added because long sample lines, with low flows, such as 0.5 LPM, will take a long time to reach the sensor head.

Oxygen pooling is a serious concern that seems to be often overlooked. The requirement for a removable extension should help increase the awareness of oxygen pooling and give the proper tool to troubleshoot and resolve areas of pooling. The Annex A asterisk will increase understanding and awareness.

Public Input No. 266-NFPA 99-2015 [Section No. 14.2.9.4.1 [Excluding any Sub-Sections]]

Oxygen levels shall be continuously monitored in any chamber in which nitrogen or other ~~diluent~~ gas is added to the chamber to reduce the volumetric concentration of oxygen in the atmosphere.

Statement of Problem and Substantiation for Public Input

I suggest the committee should have a discussion regarding this requirement. It has always been my understanding that this language was for chambers designed for control of the O2 percent in the chamber using inert gas, The existing language would require any Class B or class A chamber pressurized with air (diluent gas) or when providing an air break in an O2 filled device, to monitor the O2 percent in the chamber. I believe this is good practice but there are few class B chamber manufacturers that design the chamber with O2 percent monitoring capability. At least one UHMS accreditation surveyor has cited a class B facility for not monitoring the O2% when air was added to the chamber atmosphere.

It is best practice to require a air filled chamber to be monitored for O2 percent, what does the commiittee want to do with this language going forward? There are likely to be technology changes in the future.

Submitter Information Verification

Submitter Full Name: JAMES BELL
Organization: INTERMOUNTAIN HEALTHCARE
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jun 28 14:50:08 EDT 2015

Committee Statement

Resolution: FR-328-NFPA 99-2015

Statement: Language has been specified to make it clear that the reasoning for this requirement is specific for nitrogen and is not meant to be applied where air is used.

A minimum response time has been added because long sample lines, with low flows, such as 0.5 LPM, will take a long time to reach the sensor head.

Oxygen pooling is a serious concern that seems to be often overlooked. The requirement for a removable extension should help increase the awareness of oxygen pooling and give the proper tool to troubleshoot and resolve areas of pooling. The Annex A asterisk will increase understanding and awareness.

Public Input No. 265-NFPA 99-2015 [Section No. 14.2.9.6.1]

~~14.2~~ 3 .~~9~~ 4 .~~6.1~~ x.x.x? *

Air from compressors shall be sampled at least every 6 months and after major repair or modification of the compressor(s).

Statement of Problem and Substantiation for Public Input

Move to new section for ITM requirements

Submitter Information Verification

Submitter Full Name: JAMES BELL
Organization: INTERMOUNTAIN HEALTHCARE
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jun 28 14:47:00 EDT 2015

Committee Statement

Resolution: FR-340-NFPA 99-2015
Statement: This revision is intended to compile all ITM requirements in one location. This includes relocating the provisions previously located in 14.2.5.5 and 14.2.9.6.1.

Public Input No. 228-NFPA 99-2015 [Section No. 14.2.9.6.2]

14.2.9.6.2 *

As a minimum, the air supplied from compressors to Class A chambers shall meet the ~~requirements for CGA Grade E.~~ follwing requirements:

(1) Carbon dioxide ≤ 500 ppm v

(2) Carbon monoxide ≤ 10 ppm v

(3) Oil ≤ 0.5 mg/m 3

(4) Odor - none

(5) Total hydrocarbon content (methane) ≤ 25 ppm v

(6) Percent oxygen, balance is predominately nitrogen: 20 - 22%

(7) Moisture to comply with the following table of allowable content versus pressure.

Additional Proposed Changes

File Name	Description	Approved
Moisture_content.docx	Maximum storage or supply pressure vs moisure content table	

Statement of Problem and Substantiation for Public Input

(1) Carbon dioxide is to be specified at ≤ 500 ppmv. At 165 FSW (6 ATA), the surface equivalent value of 0.5% CO2, the accepted upper limit for human breathing, is 833 ppmv. It is recommended that NFPA 99 Chpt consider this limit over the CGA Grade E limit of 1000 ppmv.
(2) Oil is to be specified at 0.5 mg/m3, which represents the capability of any modern breathing air compressor and filtration system. This lower specification should be considered rather than the value of 10x larger currently in CGA Grade E (5.0 mg/m3). Hyperbaric chambers for clinical applications need to remain oil-free as far as possible.
(3) Moisture according to CGA Grade E is determined as the dew point above which freezing of regulators cannot occur. This applies to air compressed to pressures well in excess of 580 psi and does not apply to the majority of low pressure supply systems (< 220 psi) used in most hospitals. The table provided should be considered for pressures under 580 psi.

Submitter Information Verification

Submitter Full Name: FRANCOIS BURMAN
Organization: DIVERS ALERT NETWORK
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 23 14:47:50 EDT 2015

Committee Statement

Resolution: The committee is open to making such a change. Citations for the source document or standard for each of the values (including tables) should be provided along with any future submissions. An alternative approach would be to require a standard gas (ie Grade E) and list only exceptions to those requirements.

Public Input No. 229-NFPA 99-2015 [Section No. 14.2.9.6.3]

14.2.9.6.3

As a minimum, the air supplied from compressors to Class B chambers shall meet the requirements ~~for CGA Grade E with the~~ stated in the table below with the additional limit of no condensable hydrocarbons.

Additional Proposed Changes

File Name	Description	Approved
Oil_content.docx		

Statement of Problem and Substantiation for Public Input

The table shown below contains the requirements for breathing air that meets the oxygen compatibility requirements for pressures up to 4800 psi. This alleviates the responsibility of meeting all USP requirements for normal breathing air used in breathing apparatus that may also be used for mixtures containing high partial pressures of oxygen, including medical, 99% pure grade oxygen. (For example when switching from oxygen to breathing air in the event of an unbreathable environment in the chamber, or for air breaks.)
The table should be considered as appropriate for Class B chambers, as well as for systems containing both breathing air, as all as mixtures with high levels of oxygen. (Remember that the BIB or Hood systems usually contain 99% oxygen, but if switched to air in the event of an oxygen toxicity seizure, or in the case of unbreathable atmosphere, then when switching back to oxygen, we may expose 99% oxygen to up to 5 mg/m3 oil if we comply with CDA Grade E air. I did not mention fire….in the case of a fire, I believe we would be doing some major cleaning, if not scrapping most of this equipment.)

Submitter Information Verification

Submitter Full Name: FRANCOIS BURMAN
Organization: DIVERS ALERT NETWORK
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 23 14:57:41 EDT 2015

Committee Statement

Resolution: The committee is open to making such a change. Citations for the source document or standard for each of the values (including tables) should be provided along with any future submissions. An alternative approach would be to require a standard gas (ie Grade E) and list only exceptions to those requirements.

Public Input No. 230-NFPA 99-2015 [Section No. 14.2.9.6.4]

14.2.9.6.4

When compressed air cylinders are used to provide breathing air in Class A or Class B chambers, the breathing air shall be compressed or medical air USP, meeting the requirements stated in the revised par **14.2.9.6.3** above.

Statement of Problem and Substantiation for Public Input

Oil-free compressed air is less onerous to produce than Medical Air.

Submitter Information Verification

Submitter Full Name: FRANCOIS BURMAN
Organization: DIVERS ALERT NETWORK
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 23 15:02:31 EDT 2015

Committee Statement

Resolution: This section applies to gas cylinders and the requirement for medical air USP already addresses the quality.

Public Input No. 498-NFPA 99-2015 [Section No. 14.2.9.7]

14.2.9. ~~7~~ 1.1

Electrical monitoring equipment used inside the chamber shall comply with the applicable requirements of 14.2.8.

Statement of Problem and Substantiation for Public Input

This should be the first requirement under 14.2.9.1 "General".

Submitter Information Verification

Submitter Full Name: Kevin Posey
Organization: International ATMO, Inc.
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 16:45:13 EDT 2015

Committee Statement

Resolution: FR-334-NFPA 99-2015
Statement: This section belongs as the first requirement under 14.2.9.1 "General".

Public Input No. 500-NFPA 99-2015 [Section No. 14.2.9.8]

14.2.9. ~~8~~ 2.2 * –

Closed-circuit television monitoring of the chamber interior shall be employed for chamber operators who do not have direct visual contact with the chamber interior from their normal operating location.

Statement of Problem and Substantiation for Public Input

The requirement for closed circuit television belongs with Intercommunications.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 508-NFPA 99-2015 [Section No. A.14.2.9.8]	

Submitter Information Verification

Submitter Full Name: Kevin Posey
Organization: International ATMO, Inc.
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 16:47:39 EDT 2015

Committee Statement

Resolution: FR-335-NFPA 99-2015
Statement: The requirement for closed circuit television belongs with Intercommunications.

Public Input No. 182-NFPA 99-2015 [Section No. 14.2.10.2.5]

14.2.10.2.5

The point of exhaust shall be identified as an oxygen exhaust by a sign prohibiting smoking or open flame.

This must be bilingual and and include a pictograph of fire. All work performed on the roof near exhaust vent must be approved by the HSD.

Additional Proposed Changes

File Name	Description	Approved
IMG_4419.JPG	Should have 2 signs like this with the other in Spanish. Due to an incident that occurred in my Facility there was a close call where the language barrier played a role in the incident	

Statement of Problem and Substantiation for Public Input

Maintenance work being done in hospitals is often done by outside contractors that are left on their own with little or no guidance and assistance from facility management. Work being done on a hospitals roof by a contractor that does not speak/understand English is a potential disaster waiting to happen. Old Roofs leak, and need to be repaired. One of these methods requires Hot Tar in which a propane torch is needed to heat the tar and lay the roofing material out.

This scenario played out in my facility where I was alerted by one of the employees from the training department across the hall coming into the HBO suite wondering if we had been smelling a hot tar / new driveway smell in the Hyperbaric area. I immediately went up to the roof of the hospital, where I saw a contractor patching leaks on the roof of the building with a propane torch. He was working within 10' of the Oxygen exhaust vents on the roof above the chamber. We had a patient in the chamber at the time of the incident. I immediately yelled to the worker to discontinue his work, and extinguish the flame. (There is currently a sign in English Stating Oxygen Exhaust, No Smoking, No Open Flame. The pipes are also painted Green) . There was a language barrier, but the worker complied with my request to stop.

In following up with that incident we have concluded that the language barrier played a large role in this issue, we have just ordered signs in Spanish, as well as signs with pictures to alert workers. Secondly to make sure that your facilities management team is aware of the fire risk, and that there is a protocol in-place to inform your Safety Directors and HBO Techs of any impending work by your O2 exhaust vent pipes.

This disaster was narrowly avoided. Had the weather conditions been right (cool and humid) the oxygen venting outside would not be dissipating as quickly and stay closer to the ground (in this case the roof where the worker was using a torch on the roof). Secondly if this work was being done on a day that chamber maintenance is performed when the emergency vent is tested the roof would have been flooded with the oxygen exhaust.

Submitter Information Verification

Submitter Full Name: Bryan Kunze
Organization: Healogics
Street Address:
City:
State:
Zip:
Submittal Date: Fri Jun 05 11:00:55 EDT 2015

Committee Statement

Resolution: FR-336-NFPA 99-2015

Statement: Maintenance work being done in hospitals is often done by outside contractors that are left on their own with little or no guidance and assistance from facility management. Work being done on a hospitals roof by a contractor that does not speak/understand English is a potential disaster waiting to happen. Old Roofs leak, and need to be repaired. One of these methods requires Hot Tar in which a propane torch is needed to heat the tar and lay the roofing material out.

Public Input No. 512-NFPA 99-2015 [Section No. 14.2.10.3]

14.2. ~~10~~ 1 .3 – .3

The supply piping for all air, oxygen, or other breathing mixtures from certified commercially supplied cylinders and portable containers shall be provided with a particulate filter of 66 microns or finer.

14.2. ~~10~~ 1 .3. 3. 1 –

The particulate filter shall meet the construction requirements of ANSI/ASME PVHO-1, *Safety Standard for Pressure Vessels for Human Occupancy*, and be located as close as practical to the source.

Statement of Problem and Substantiation for Public Input

This requirement is clearly a piping issue and should be located in section 14.2.1.3 "Hyperbaric Piping Requirements", not in 14.2.10 "other Equipment and Fixtures".

Submitter Information Verification

Submitter Full Name: Kevin Posey
Organization: International ATMO, Inc.
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 17:02:06 EDT 2015

Committee Statement

Resolution: FR-337-NFPA 99-2015
Statement: This requirement is clearly a piping issue and should be located in section 14.2.1.3 "Hyperbaric Piping Requirements", not in 14.2.10 "other Equipment and Fixtures".

Public Input No. 240-NFPA 99-2015 [Sections 14.3.1.4.4, 14.3.1.4.5]

Sections 14.3.1.4.4, 14.3.1.4.5

14.3.1. ~~4.4~~ 5 Emergency Procedures

14.3.1.5.1

Emergency procedures specific to the hyperbaric facility shall be established.

14.3.1. 4 5 . ~~4.1~~ 2 *

All personnel shall be trained in emergency procedures.

14.3.1. 4 5 .4 ~~.2~~

Personnel shall be trained to control the chamber and decompress occupants when all powered equipment has been rendered inoperative.

14.3.1. 4 5 . ~~5~~ 3 *

Emergency procedures and fire training drills shall be conducted at least annually and documented by the safety director.

14.3.1.5.3.1

The time required to evacuate all persons from a hyperbaric area with a full complement of chamber occupants all at treatment pressure shall be measured annually.

14.3.1.5.3.2

The occupants for the timed evacuation drill shall be permitted to be simulated.

Statement of Problem and Substantiation for Public Input

Requirements related to emergency procedures have been relocated to a new section titled "Emergency Procedures". Surveys have shown that compliance with conducting emergency drills is poor. Creating the new section adds emphasis to these requirements.
Two requirements on emergency drills previously located in 14.2.4 (chamber ventilation) have been moved to this new section.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 239-NFPA 99-2015 [Section No. 14.2.4.5]	Material from 14.2.4.5 has been moved to new section 14.3.1.5

Submitter Information Verification

Submitter Full Name: ROBERT SHEFFIELD
Organization: INTERNATIONAL ATMO INC
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 24 12:18:40 EDT 2015

Committee Statement

Resolution: FR-313-NFPA 99-2015
Statement: Requirements related to emergency procedures have been relocated to a new section titled "Emergency Procedures". Surveys have shown that compliance with conducting emergency drills is poor. Creating the new section adds emphasis to these requirements.

Two requirements on emergency drills previously located in 14.2.4 (chamber ventilation) have been moved to this new section.

Public Input No. 267-NFPA 99-2015 [Section No. 14.3.1.5.1]

14.3.1.5.1 Potential Ignition Sources.

14.3.1.5.1.1*

The following shall be prohibited from inside the chamber and the immediate vicinity outside the chamber:

(1) Smoking

(2) Open flames

(3) Hot objects

14.3.1.5.1.2

The following shall be prohibited from inside the chamber:

(1) Personal warming devices (e.g., therapeutic chemical heating pads, hand warmers, pocket warmers)

(2) Cell phones and pagers

(3) Sparking toys

(4) Personal entertainment devices

14.3.1.5.1.3 A Safety Time Out, Pause (STOP) shall be completed prior to chamber operations, the STOP shall include

(1) Right patient, two identifiers

(2) Right treatmentas ordered by the medical director

(3) Right safety; correct level of qualified staff, patient ground verified, no prohibited items, textiles

Additional Proposed Changes

File Name	Description	Approved
STOP_July_2014.pdf		
hyperbaric_and_hypobaric_cha.pdf		

Statement of Problem and Substantiation for Public Input

It has been shown by Sheffield et all, that some 80% of mishaps have occurred in chambers because of some prohibited item allowed to come into the chamber during operation. The UHMS has adopted a position statement regarding a safety time out modeled after surgery prior to chamber operations. The Joint Commission has patient safety at the top of the list for accreditation. This procedure would be good to have in code as part of a culture change and expectation for our chamber operators.

Submitter Information Verification

Submitter Full Name: JAMES BELL
Organization: INTERMOUNTAIN HEALTHCARE
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jun 28 15:04:47 EDT 2015

Committee Statement

Resolution: FR-319-NFPA 99-2015

Statement: It has been shown by Sheffield et all, that some 80% of mishaps have occurred in chambers because of some prohibited item allowed to come into the chamber during operation. The UHMS has adopted a position statement regarding a safety time out modeled after surgery prior to chamber operations. Requiring a per-treatment safety check will help keep hazards out of the chamber. Additional annex material has been added to guide the user on what this check might include.

Public Input No. 501-NFPA 99-2015 [New Section after 14.3.1.5.4.4]

Add New Section after 14.3.1.5.4.4

Products permitted inside of a Class A or Class B chamber shall be tested to ASTM G72 and evaluated by UHMS Material Selection Guidelines Booklet.

Statement of Problem and Substantiation for Public Input

Testing to ASTM G72 and use of the UHMS Booklet will give the safety director and physician in charge a systematic means to determine the safety of a product.

Submitter Information Verification

Submitter Full Name: RICHARD BARRY
Organization: HEALOGICS
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 16:47:45 EDT 2015

Committee Statement

Resolution: This is being sent back to the submitter to supply more information. It is understood that the proposed referenced document is not completely through its approval stage. The committee welcomes additional information during the comment period.

Public Input No. 278-NFPA 99-2015 [Section No. 14.3.1.5.4.5(A)]

(A)

Upholstered furniture (fixed or portable), shall be resistant to a cigarette ignition (i.e., smoldering) in accordance with one of the following:

(1) The components of the upholstered furniture shall meet the requirements for Class 1 when tested in accordance with NFPA 260, *Standard Methods of Tests and Classification System for Cigarette Ignition Resistance of Components of Upholstered Furniture*~~; ASTM E 1353, *Standard Test Methods for Cigarette Ignition Resistance of Components of Upholstered Furniture* ; or California Technical Bulletin 133, *Flammability Test Procedure for Seating Furniture for Use in Public Occupancies*~~ .

(2) Mocked-up composites of the upholstered furniture shall have a char length not exceeding 1 ½ in. (38 mm) when tested in accordance with NFPA 261, *Standard Method of Test for Determining Resistance of Mock-Up Upholstered Furniture Material Assemblies to Ignition by Smoldering Cigarettes*~~, or ASTM E 1352, *Standard Test Method for Cigarette Ignition Resistance of Mock-Up Upholstered Furniture Assemblies*~~ .

Statement of Problem and Substantiation for Public Input

ASTM E1352 and ASTM E1353 have not updated their ignition source and they use a cigarette designed not to ignite textile materials. NFPA 260 and NFPA 261 have been updated and use the correct ignition source. CA TB 133 is a heat release test and does not classify materials as Class 1 for smoldering.

Submitter Information Verification

Submitter Full Name: MARCELO HIRSCHLER
Organization: GBH INTERNATIONAL
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jun 29 21:26:09 EDT 2015

Committee Statement

Resolution: FR-329-NFPA 99-2015. The wording was revised in an attempt to meet the concerns of the public input but to also still allow a variety of tests to meet the requirement.

Statement: The wording has been revised to encompass tests that don't necessarily require cigarette ignition or smoldering. This permits alternative tests to be used rather than limiting it to just one. The intention is that the upholstered furniture be resistant to ignition.

Public Input No. 279-NFPA 99-2015 [Section No. 14.3.1.5.4.6]

14.3.1.5.4.6 Mattresses.

~~Mattresses~~ Mattress components shall have a char length not exceeding 2 in. (51 mm) when tested in accordance with 16 CFR 1632, *Standard for the Flammability of Mattresses and Mattress Pads* (FF 4-72) ~~; 16 CFR Part 1633, *Standard for the Flammability (Open Flame) of Mattress Sets* ; or California Technical Bulletin 129, *Flammability Test Procedure for Mattresses for Use in Public Buildings*~~ or NFPA 260, Standard Methods of Tests and Classification System for Cigarette Ignition Resistance of Components of Upholstered Furniture .

Mattresses shall have limited rates of heat release when tested in accordance with ASTM ~~E 1590~~ E1590 , *Standard Test Method for Fire Testing of Mattresses*, as follows:

(1) The peak rate of heat release for the mattress shall not exceed 100 kW. The peak rate of heat release for the mattress shall not exceed 100 kW.

(2) The total heat released by the mattress during the first 10 minutes of the test shall not exceed 25 MJ.

Statement of Problem and Substantiation for Public Input

Neither 16 CFR 1633 nor CA TB 129 assess smoldering, which is what 16 CFR1632 and NFPA 260 do. Moreover, both 16 CFR 1632 and NFPA 260 deal with components of mattresses and not the full mattress.

Submitter Information Verification

Submitter Full Name: MARCELO HIRSCHLER
Organization: GBH INTERNATIONAL
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jun 29 23:52:21 EDT 2015

Committee Statement

Resolution: FR-330-NFPA 99-2015
Statement: The wording was revised in an attempt to continue to allow a variety of tests to meet the requirements which can be applied to both mattresses and mattress components..

Public Input No. 521-NFPA 99-2015 [Section No. 14.3.1.5.4.6]

14.3.1.5.4.6 ~~Mattresses.~~

Mattresses shall have a char length not exceeding 2 in. (51 mm) when tested in accordance with 16 CFR 1632, *Standard for the Flammability of Mattresses and Mattress Pads* (FF 4-72); 16 CFR Part 1633, *Standard for the Flammability (Open Flame) of Mattress Sets*; or California Technical Bulletin 129, *Flammability Test Procedure for Mattresses for Use in Public Buildings*.

Mattresses shall have limited rates of heat release when tested in accordance with ASTM E 1590, *Standard Test Method for Fire Testing of Mattresses*, as follows:

(1) The peak rate of heat release for the mattress shall not exceed 100 kW. The peak rate of heat release for the mattress shall not exceed 100 kW.

(2) The total heat released by the mattress during the first 10 minutes of the test shall not exceed 25 MJ.

Statement of Problem and Substantiation for Public Input

The section title of Mattresses should be deleted because it leads the user of the document to believe that sections 14.3.1 5.4.7 through 14.3.1.5.4.9 are subordinate to 14.3.1.5.4.6.

Submitter Information Verification

Submitter Full Name: Kevin Posey
Organization: International ATMO, Inc.
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 17:29:18 EDT 2015

Committee Statement

Resolution: The numbering of the sections do not make the sections in question subordinate requirements to mattresses.

Public Input No. 280-NFPA 99-2015 [Section No. 14.3.1.5.4.7]

14.3.1.5.4.7

Fill materials contained within upholstered furniture and mattresses shall comply with the open flame test in Section A-1 of the 2000 edition of California Technical Bulletin 117 Requirements, *Test Procedure and Apparatus for Testing the Flame Retardance of Resilient Filling Materials Used in Upholstered Furniture*.

Statement of Problem and Substantiation for Public Input

This is just clarification, since the latest edition of the standard no longer has an open flame test, which was what the requirements used to be.

Submitter Information Verification

Submitter Full Name: MARCELO HIRSCHLER
Organization: GBH INTERNATIONAL
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jun 29 23:56:59 EDT 2015

Committee Statement

Resolution: FR-331-NFPA 99-2015
Statement: This revision clarifies the current requirement. The latest edition of the standard no longer has an open flame test, which was what the requirements were previously.

Public Input No. 253-NFPA 99-2015 [Section No. 14.3.1.5.5 [Excluding any Sub-Sections]]

The use of flammable hair sprays, hair oils, and skin oils shall be ~~forbidden~~ prohibited for all chamber occupants/patients as well as personnel.

Statement of Problem and Substantiation for Public Input

Try to use another word than forbidden

Submitter Information Verification

Submitter Full Name: JAMES BELL
Organization: INTERMOUNTAIN HEALTHCARE
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jun 28 12:32:06 EDT 2015

Committee Statement

Resolution: FR-333-NFPA 99-2015
Statement: Editorial revision.

Public Input No. 281-NFPA 99-2015 [Section No. 14.3.1.5.7]

14.3.1.5.7

Drapes used within the chamber shall meet the flame propagation performance criteria contained in Test 1 or Test 2, as appropriate, of NFPA 701, *Standard Methods of Fire Tests for Flame Propagation of Textiles and Films*.

Statement of Problem and Substantiation for Public Input

NFPA 101 and NFPA 5000 (and other documents) have been revised as shown because the reference to just NFPA 701 has led to "cheating" by using a "small-scale test" that has been eliminated from NFPA 701 in the 1980s because it was an invalid test that did not represent improved fire performance.

Submitter Information Verification

Submitter Full Name: MARCELO HIRSCHLER
Organization: GBH INTERNATIONAL
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jun 29 23:59:36 EDT 2015

Committee Statement

Resolution: FR-332-NFPA 99-2015
Statement: NFPA 101 and NFPA 5000 (and other documents) have been revised as shown because the reference to just NFPA 701 has led to "cheating" by using a "small-scale test" that has been eliminated from NFPA 701 in the 1980s because it was an invalid test that did not represent improved fire performance.

Public Input No. 525-NFPA 99-2015 [Section No. 14.3.2.1.6]

14.3. ~~2.~~ 1. ~~6~~ 5.9 *

Paper brought into the chamber shall be stored in a closed metal container.

Statement of Problem and Substantiation for Public Input

This requirement is out of place currently and is better located in this section.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 526-NFPA 99-2015 [Section No. 14.3.2.1.7]	
Public Input No. 527-NFPA 99-2015 [Section No. A.14.3.2.1.6]	

Submitter Information Verification

Submitter Full Name: Kevin Posey
Organization: International ATMO, Inc.
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 17:39:53 EDT 2015

Committee Statement

Resolution: FR-338-NFPA 99-2015
Statement: This requirement is out of place currently and is better located in the general materials section.

Public Input No. 526-NFPA 99-2015 [Section No. 14.3.2.1.7]

14.3. ~~2~~ 1 . 5.9. 1 ~~.7~~

Containers used for paper storage shall be emptied after each chamber operation.

Statement of Problem and Substantiation for Public Input

this section is subordinate to the requirement in section 14.3.1.5.9.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 525-NFPA 99-2015 [Section No. 14.3.2.1.6]	

Submitter Information Verification

Submitter Full Name: Kevin Posey
Organization: International ATMO, Inc.
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 17:42:56 EDT 2015

Committee Statement

Resolution: FR-338-NFPA 99-2015
Statement: This requirement is out of place currently and is better located in the general materials section.

Public Input No. 255-NFPA 99-2015 [Section No. 14.3.4]

14.3.4 Inspection, Testing and Maintenance.

14.3.4.1 General.

14.3.4.1.1

The hyperbaric safety director shall ensure that all valves, regulators, meters, and similar equipment used in the hyperbaric chamber are compensated for use under hyperbaric conditions and tested as part of the routine maintenance program of the facility.

14.3.4.1.1.1

Pressure relief valves shall be tested and calibrated as part of the routine maintenance program of the facility.

14.3.4.1.2

The hyperbaric safety director shall ensure that all gas outlets in the chambers are labeled or stenciled in accordance with CGA C-4, *Standard Method of Marking Portable Compressed Gas Containers to Identify the Material Contained*.

14.3.4.1.3

The requirements set forth in Section 5.1 and NFPA 55, *Compressed Gases and Cryogenic Fluids Code*, concerning the storage, location, and special precautions required for medical gases shall be followed.

14.3.4.1.4

Storage areas for hazardous materials shall not be located in the room housing the hyperbaric chamber. *(See 14.2.1.)*

14.3.4.1.4.1

Flammable gases, except as provided in 14.3.1.5.2.2 (1), shall not be used or stored in the hyperbaric room.

14.3.4.1.5

All replacement parts and components shall conform to original design specification.

14.3.4.2 Maintenance Logs.

14.3.4.2.1

Installation, repairs, and modifications of equipment related to a chamber shall be evaluated by engineering personnel, tested under pressure, and approved by the safety director.

14.3.4.2.1.1

Logs of all tests shall be maintained.

14.3.4.2.2

Operating equipment logs shall be maintained by engineering personnel.

14.3.4.2.2.1

Operating equipment logs shall be signed before chamber operation by the person in charge. *(See A.14.3.1.3.2.)*

14.3.4.2.3

Operating equipment logs shall not be taken inside the chamber.

Statement of Problem and Substantiation for Public Input

Create one section where all the ITM requirements are located, this will require renumbering, search of the chapter for missed opportunities and most likely new annex notes. PI already submitted may support this idea.

Submitter Information Verification

Submitter Full Name: JAMES BELL
Organization: INTERMOUNTAIN HEALTHCARE
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jun 28 13:30:34 EDT 2015

Committee Statement

Resolution: FR-340-NFPA 99-2015

Statement: This revision is intended to compile all ITM requirements in one location. This includes relocating the provisions previously located in 14.2.5.5 and 14.2.9.6.1.

Public Input No. 254-NFPA 99-2015 [Section No. 14.3.6]

14.3.6* ~~Electrostatic Safeguards.~~ - Inspection, Testing and Maintenance

14.3.6.1 Administration. (Reserved)

14.3.6.2 ~~Maintenance.~~ - Electrostatic safeguards

14.3.6.2.1 Furniture ~~Used in the Chamber~~ and grounding .

14.3.6.2.1.1

Conductive devices on furniture and equipment shall be inspected to ensure that they are free of wax, lint, or other extraneous material that could insulate them and defeat the conductive properties.

14.3.6.2.1.2*

Casters or furniture leg tips shall not be capable of impact sparking.

14.3.6.2.1.3

Casters shall not be lubricated with oils or other flammable materials.

14.3.6.2.1.4

Lubricants shall be oxygen compatible.

14.3.6.2.1.5

Wheelchairs and gurneys with bearings lubricated and sealed by the manufacturer shall be permitted in Class A chambers where conditions prescribed in 14.2.9.4 are met.

14.3.6.2.2 Conductive Accessories.

Conductive accessories shall meet conductivity and antistatic requirements.

14.3.6.2. 3

Patient ground shall be verified in class B chambers prior to each chamber operation and for class A chambers as stipulated by the SD

14. 3 .6.2.4

Chamber ground shall be verified for class A and class B chambers as part of the PM program of the facility

14.3.6.2.3 *

Materials containing rubber shall be inspected as part of the routine maintenance program of the facility, especially at points of kinking.

14.3. ~~6.3~~ 7 Fire Protection Equipment ~~Inside~~ for class A Hyperbaric Chambers.

14.3.6 7 .3. 1

Electrical switches, valves, and electrical monitoring equipment associated with fire detection and extinguishment shall be visually inspected before each chamber pressurization.

14.3.6 7 .3. 2

Fire detection equipment shall be tested each week, and full testing, including discharge of extinguishing media, shall be conducted annually.

14.3.6 7 .3.3

Testing shall include activation of trouble circuits and signals.

14.3.~~6.4~~ 8 * Housekeeping.

A housekeeping program shall be implemented, whether or not the facility is in regular use.

14.3.6 8 .4. 1

The persons assigned to the task of housekeeping shall be trained in the following:

(1) Potential damage to the equipment from cleaning procedures

(2) Potential personal injury

(3) Specific cleaning procedures

(4) Equipment not to be cleaned

Statement of Problem and Substantiation for Public Input

Suggest one section where all the inspections, testing and maintenance requirements are located.

Submitter Information Verification

Submitter Full Name: JAMES BELL
Organization: INTERMOUNTAIN HEALTHCARE
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jun 28 12:39:14 EDT 2015

Committee Statement

Resolution: FR-340-NFPA 99-2015
Statement: This revision is intended to compile all ITM requirements in one location. This includes relocating the provisions previously located in 14.2.5.5 and 14.2.9.6.1.

Public Input No. 252-NFPA 99-2015 [Section No. 14.3.6.3]

14.3. ~~6.3~~ 7 Fire Protection Equipment ~~Inside~~ for class A Hyperbaric Chambers.

14.3. 6 7 . ~~3.~~ 1 –

Electrical switches, valves, water level, air pressure and electrical monitoring equipment associated with fire detection and extinguishment shall be visually inspected before each chamber pressurization.

14.3. 6 7 . ~~3.~~ 2 –

Fire detection equipment shall be tested each week, and full testing, including discharge of extinguishing media, shall be conducted annually.

14.3. 6 7 .3 ~~.3~~ –

Testing shall include activation of trouble circuits and signals.

14.3.7.4*

Applicable sections of NFPA 25, 2014 edition, chapter 9 Water storage tanks, Table 9.1.1.2 shall be used as a guide for the inspection, testing and maintnence of the water storage tanks for class A chambers

Statement of Problem and Substantiation for Public Input

This section is listed under electrostatic safeguards and should have it own section.

NFPA 25 scope is minimum standards for the inspection, testing and maintenance of water based fire protection equipment. I suggest we look at this as a committee and decide if it is appropriate or not to reference it. There is at least one facility that has been cited by the AHJ because they had not documentation that they were following NFPA 25. Our deluge systems are water based. I have been using chapter 9 for ITM of our class A chamber water storage tank for 8 years and have found it a useful tool.

There will need to be an annex note, not all class a chamber sytems are designed with access to the interior of the water storage tank and 25 is to be used as a guide for ITM not a requirement.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 256-NFPA 99-2015 [Section No. 14.2.5.5]	

Submitter Information Verification

Submitter Full Name: JAMES BELL
Organization: INTERMOUNTAIN HEALTHCARE
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jun 28 11:03:24 EDT 2015

Committee Statement

Resolution: FR-340-NFPA 99-2015
Statement: This revision is intended to compile all ITM requirements in one location. This includes relocating the provisions previously located in 14.2.5.5 and 14.2.9.6.1.

Public Input No. 528-NFPA 99-2015 [Section No. 14.3.6.3]

14.3. ~~6.3~~ 7 Fire Protection Equipment Inside Hyperbaric Chambers.

14.3. ~~6~~ 7 . ~~3.~~ 1

Electrical switches, valves, and electrical monitoring equipment associated with fire detection and extinguishment shall be visually inspected before each chamber pressurization.

14.3. ~~6~~ 7 . ~~3.~~ 2

Fire detection equipment shall be tested each week, and full testing, including discharge of extinguishing media, shall be conducted annually.

14.3. ~~6~~ 7 .3 ~~.3~~

Testing shall include activation of trouble circuits and signals.

Statement of Problem and Substantiation for Public Input

The information in sections 14.3.6.3 "Fire Protection Equipment Inside Hyperbaric Chambers" should not be subordinate to section 14.3.6 "Electrostatic Safeguards", but should be equal to section 14.3.6.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 529-NFPA 99-2015 [Section No. 14.3.6.4]	

Submitter Information Verification

Submitter Full Name: Kevin Posey
Organization: International ATMO, Inc.
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 17:50:44 EDT 2015

Committee Statement

Resolution: FR-340-NFPA 99-2015
Statement: This revision is intended to compile all ITM requirements in one location. This includes relocating the provisions previously located in 14.2.5.5 and 14.2.9.6.1.

Public Input No. 251-NFPA 99-2015 [Section No. 14.3.6.4]

14.3.~~6.4~~ 8 * Housekeeping.

A housekeeping program shall be implemented, whether or not the facility is in regular use.

14.3.6 8 .~~4.~~ 1

The persons assigned to the task of housekeeping shall be trained in the following:

(1) Potential damage to the equipment from cleaning procedures

(2) Potential personal injury

(3) Specific cleaning procedures

(4) Equipment not to be cleaned

Statement of Problem and Substantiation for Public Input

This section is titled electrostatic safeguards, Housekeeping should have its own number.

Submitter Information Verification

Submitter Full Name: JAMES BELL
Organization: INTERMOUNTAIN HEALTHCARE
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jun 28 10:52:45 EDT 2015

Committee Statement

Resolution: FR-340-NFPA 99-2015
Statement: This revision is intended to compile all ITM requirements in one location. This includes relocating the provisions previously located in 14.2.5.5 and 14.2.9.6.1.

Public Input No. 529-NFPA 99-2015 [Section No. 14.3.6.4]

14.3. ~~6.4~~ 8 * Housekeeping.

A housekeeping program shall be implemented, whether or not the facility is in regular use.

14.3. ~~6~~ 8 . ~~4.~~ 1

The persons assigned to the task of housekeeping shall be trained in the following:

(1) Potential damage to the equipment from cleaning procedures

(2) Potential personal injury

(3) Specific cleaning procedures

(4) Equipment not to be cleaned

Statement of Problem and Substantiation for Public Input

The information in sections 14.3.6.4 "Housekeeping" should not be subordinate to section 14.3.6 "Electrostatic Safeguards", but should be equal to section 14.3.6.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 528-NFPA 99-2015 [Section No. 14.3.6.3]	
Public Input No. 530-NFPA 99-2015 [Section No. A.14.3.6.4]	

Submitter Information Verification

Submitter Full Name: Kevin Posey
Organization: International ATMO, Inc.
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 17:56:02 EDT 2015

Committee Statement

Resolution: FR-340-NFPA 99-2015
Statement: This revision is intended to compile all ITM requirements in one location. This includes relocating the provisions previously located in 14.2.5.5 and 14.2.9.6.1.

Public Input No. 208-NFPA 99-2015 [Section No. 15.7.4.3.1]

15.7.4.3.1 * -

~~Where buildings are required to be subdivided into smoke compartments, fire alarm notification zones shall coincide with one or more smoke compartment boundaries or shall be in accordance with the facility fire plan~~ The alarm zone shall be permitted to coincide with the permitted area for smoke compartments .

Statement of Problem and Substantiation for Public Input

The proposed text currently exists as Paragraph 18.3.4.3.3.2, NFPA 101-2015. It is recognized that the NFPA 101 text addresses annunciation (initiating devices) and the NFPA 99 text address notification appliances. A similar Public Input was submitted to NFPA 101 to adopt the language in NFPA 99. Regardless, the requirements of NFPA 99 and NFPA 101 should be the same.

If the NFPA 101 text is adopted, as proposed by the Public Input, the existing Annex note to this paragraph should also be deleted.

Submitter Information Verification

Submitter Full Name: WILLIAM KOFFEL
Organization: KOFFEL ASSOCIATES INC
Affilliation: Self
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 16 13:59:58 EDT 2015

Committee Statement

Resolution: The term “alarm zone” is not defined in NFPA 72. Additionally, the alarm notification should be required, not permitted (especially in new construction), to coincide with smoke compartments. The committee will be open to reviewing the action of the NFPA 101 committee on the similar input at the public comment stage.

Public Input No. 382-NFPA 99-2015 [Section No. 15.7.4.3.5]

15.7.4.3.5

In ~~critical care areas~~ Categroy 1 space , visible alarm notification appliances shall be permitted to be used in lieu of audible alarm signals.

Statement of Problem and Substantiation for Public Input

Definition for Critical Care Area is covered in NFPA 99: 3.3.137 Patient Care Space and is designated as Category 1 Space. Any references in NFPA 99 to “Critical Care Area” should be changed to “Category 1 Space”.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 357-NFPA 99-2015 [Section No. 3.3.28]	

Submitter Information Verification

Submitter Full Name: GARY BECKSTRAND
Organization: UTAH ELECTRICAL JATC
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jul 05 12:40:47 EDT 2015

Committee Statement

Resolution: FR-109-NFPA 99-2015

Statement: This section has been revised to allow the omission of either or both audible and visual alarms in any patient care space regardless of the risk category, where a risk assessment determines the alarm notification can adversely affect patient care. The previous language only permitted this for critical care areas, which could limit the allowance from being applied to spaces where this can be beneficial.

Public Input No. 384-NFPA 99-2015 [Section No. 15.7.4.3.5]

15.7.4.3.5

In ~~critical care areas~~ Categroy 1 space , visible alarm notification appliances shall be permitted to be used in lieu of audible alarm signals.

Statement of Problem and Substantiation for Public Input

Definition for Critical Care Area is covered in NFPA 99: 3.3.137 Patient Care Space and is designated as Category 1 Space. Any references in NFPA 99 to “Critical Care Area” should be changed to “Category 1 Space”.

Submitter Information Verification

Submitter Full Name: GARY BECKSTRAND
Organization: UTAH ELECTRICAL JATC
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jul 05 12:45:04 EDT 2015

Committee Statement

Resolution: FR-109-NFPA 99-2015
Statement: This section has been revised to allow the omission of either or both audible and visual alarms in any patient care space regardless of the risk category, where a risk assessment determines the alarm notification can adversely affect patient care. The previous language only permitted this for critical care areas, which could limit the allowance from being applied to spaces where this can be beneficial.

Public Input No. 238-NFPA 99-2015 [Section No. A.1.1.12]

A.1.1.12

~~During the past 20 years, there has been a widespread interest in the use of oxygen at elevated environmental pressure to increase the partial pressure of oxygen in a patient's tissues in order to treat certain medical conditions or to prepare a patient for surgery. These techniques are also employed widely for the treatment of decompression sickness (e.g., bends, caisson worker's disease) and carbon monoxide poisoning.~~

~~Recently, however, the level of knowledge and expertise has increased so dramatically that the codes are in need of updating. By the end of 1988, there were 218 hyperbaric facilities in operation in the United States and Canada. These facilities supported hyperbaric medical treatments for 62,548 patients between 1971 and 1987. As these facilities provide therapy for disorders indicated for treatment, these numbers will continue to increase. As the number of facilities increases, the number of patients treated will also increase.~~

~~Such treatment involves placement of the patient, with or without attendants, in a hyperbaric chamber or pressure vessel, the pressure of which is raised above ambient pressure. In the course of the treatment, the patient breathes up to 100 percent oxygen.~~

~~In addition to being used for patient care, these chambers also are being employed for research purposes using experimental animals and, in some instances, humans.~~

~~The partial pressure of oxygen present in a gaseous mixture is the determinate factor in the amount of available oxygen. This pressure will rise if the volume percentage of oxygen present increases, if the total pressure of a given gas mixture containing oxygen increases, or if both these factors increase. Because the sole purpose of the hyperbaric technique of treatment is to raise the total pressure within the treatment chamber, an increased partial pressure of oxygen always is available during treatment, unless positive means are taken to limit the oxygen content. In addition, the patient is often given an oxygen-enriched atmosphere to breathe.~~

~~The need for human diligence in the establishment, operation, and maintenance of hyperbaric facilities is continual. The chief administrator of the facility possessing the hyperbaric chamber is responsible to adopt and enforce appropriate regulations for hyperbaric facilities. In formulating and administering the program, full use should be made of technical personnel highly qualified in hyperbaric chamber operations and safety.~~

~~It is essential that personnel having responsibility for the hyperbaric facility establish and enforce appropriate programs to fulfill the provisions of Chapter 14 .~~

~~Potential hazards can be controlled only when continually recognized and understood by all pertinent personnel.~~

~~The purpose of Chapter 14 is to set forth minimum safeguards for the protection of patients or others subject to, and personnel who administer, hyperbaric therapy and experimental procedures. Its purpose is also to offer some guidance for rescue personnel who are not ordinarily involved in hyperbaric chamber operation, but who could become so involved in an emergency.~~

~~Requirements cited in 1.1.12 are minimum requirements. Discretion on the part of chamber operators and others might dictate the establishment of more stringent regulations~~ Hyperbaric chambers are found in a variety of settings, including hospitals, doctors offices, private clinics, and business occupancies. Not all hyperbaric facilities are designed or equipped the same. Hyperbaric treatment is used for a variety of emergent and non-emergent conditions; and the possible acuity of patients ranges from critically ill to stable outpatients. Hyperbaric facilities vary in the types of conditions treated and the acuity of patients accepted. These variations lead to differences in hyperbaric equipment, ancillary support equipment, and facility location. This chapter is intended to provide minimum safeguards for hyperbaric patiets and personnel regardless of the location of the facility .

Statement of Problem and Substantiation for Public Input

The annex material is out of date and required revision. When last edited, this material was located in the hyperbaric facilities chapter and served as a preamble to the chapter's requirements. The material is out of context now that it is located in Chapter 1.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 237-NFPA 99-2015 [Section No. 1.1.12]	Paragraph 1.1.12 and its corresponding annex note.

Submitter Information Verification

Submitter Full Name: ROBERT SHEFFIELD
Organization: INTERNATIONAL ATMO INC
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 23 21:43:08 EDT 2015

Committee Statement

Resolution: FR-103-NFPA 99-2015

Statement: This revision specifies that the hyperbaric facilities chapter is used for facility design, chamber design, and facility operation. The section has been further revised to make the existing paragraph more concise.

The annex material is out of date and required revision. When last edited, this material was located in the hyperbaric facilities chapter and served as a preamble to the chapter's requirements. The material is out of context now that it is located in Chapter 1.

Public Input No. 28-NFPA 99-2015 [Section No. A.3.2.2]

A.3.2.2 Authority Having Jurisdiction (AHJ).

The phrase “authority having jurisdiction,” or its acronym AHJ, is used in NFPA documents in a broad manner, since jurisdictions and approval agencies vary, as do their responsibilities. Where public safety is primary, the authority having jurisdiction may be a federal, state, local, or other regional department or individual such as a fire chief; fire marshal; chief of a fire prevention bureau, labor department, or health department; building official; electrical inspector; special inspector; designee or others having statutory authority. For insurance purposes, an insurance inspection department, rating bureau, or other insurance company representative may be the authority having jurisdiction. In many circumstances, the property owner or his or her designated agent or designee assumes the role of the authority having jurisdiction; at government installations, the commanding officer or departmental official may be the authority having jurisdiction.

Statement of Problem and Substantiation for Public Input

just clarifying additional individuals

Submitter Information Verification

Submitter Full Name: John Gregory
Organization: HDR Architecture Inc.
Affilliation: PIPE Medical Gas Committee Phoenix, AZ
Street Address:
City:
State:
Zip:
Submittal Date: Wed Apr 08 12:18:25 EDT 2015

Committee Statement

Resolution: The definition and associated Annex material are under the jurisdiction of the NFPA Standards Council. Any suggested revision to the definition of AHJ should be referred to them.

Public Input No. 383-NFPA 99-2015 [Section No. A.3.3.160]

A.3.3.160 Surface-Mounted Medical Gas Rail Systems.

It is the intent that surface-mounted medical gas rail systems would be permitted in individual patient rooms but would not be permitted to go directly through room walls to adjacent patient rooms. However, it is the intent to permit surface-mounted medical gas rails to be used in a given critical care area where there can be a partition separating certain patient care functions, essentially leaving the system within the given ~~critical care area~~ Category 1 space . As an example, two adjacent patient rooms outside of a ~~critical~~ Category 1 space care unit would not be permitted to have a surface-mounted medical gas rail interconnect between the two rooms through the wall. However, in a nursery where there might be one or two segregated areas for isolation, a medical gas rail system supplying more than one isolation room, but within the nursery area, would be permitted to be interconnected with the nursery system.

Statement of Problem and Substantiation for Public Input

Definition for Critical Care Area is covered in NFPA 99: 3.3.137 Patient Care Space and is designated as Category 1 Space. Any references in NFPA 99 to “Critical Care Area” should be changed to “Category 1 Space”.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 357-NFPA 99-2015 [Section No. 3.3.28]	

Submitter Information Verification

Submitter Full Name: GARY BECKSTRAND
Organization: UTAH ELECTRICAL JATC
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jul 05 12:42:23 EDT 2015

Committee Statement

Resolution: FR-604-NFPA 99-2015
Statement: temrinology

Public Input No. 51-NFPA 99-2015 [Section No. A.5.1.3.3]

A.5.1.3.3

~~The bulk supply system should be installed on a site that has been prepared to meet the requirements of NFPA 55, *Compressed Gases and Cryogenic Fluids Code* , or CGA G-8.1, *Standard for Nitrous Oxide Systems at Consumer Sites* . A storage unit(s), reserve, pressure regulation, and a signal actuating switch(es) are components of the supply system. Shutoff valves, piping from the site, and electric wiring from a signal switch(es) to the master signal panels are components of the piping system.~~

~~The bulk supply system is normally installed on the site by the owner of this equipment. The owner or the organization responsible for the operation and maintenance of the bulk supply system is responsible for ensuring that all components of the supply system — main supply, reserve supply, supply system signal-actuating switch(es), and delivery pressure regulation equipment — function properly before the system is put in service.~~

In the locating of Central Supply Systems, consideration should be given to ensuring the resilience of the facility under reasonably anticipated adverse conditions. Examples have included:

• Flooding of systems located in basements from extraordinary weather, water main breaks, and sprinkler head failures.

• Seismic events which rendered the supply system inoperative.

• Degradation of the quality of air at the intake due to a nearby fire and chemical release.

• Electrical problems including failure of motor control centers and failure of switchgear to properly connect.

Many of these risks can be ameliorated by care when siting the central supply systems and their utility connections.

Move existing text to 5.1.3.3.1.6

Statement of Problem and Substantiation for Public Input

There is a great deal of concern being expressed over ensuring the resilience of medical facilities and a great deal of press on the problems that have resulted from failure of medical facilities to fulfill their mission when some problem occurred which in retrospect could reasonably been anticipated. This Annex note simply attempts to call attention to the desirability of thinking about this in the design process.

Submitter Information Verification

Submitter Full Name: Mark Allen
Organization: Beacon Medaes
Street Address:
City:
State:
Zip:
Submittal Date: Thu Apr 09 15:29:36 EDT 2015

Committee Statement

Resolution: FR-681-NFPA 99-2015
Statement: There is a great deal of concern being expressed over ensuring the resilience of medical facilities and a great deal of press on the problems that have resulted from failure of medical facilities to fulfill their mission when some problem occurred which in retrospect could reasonably been anticipated. This addition to this annex note simply attempts to call attention to the desirability of thinking about this in the design process.

Public Input No. 150-NFPA 99-2015 [New Section after A.5.1.3.5.11]

A 5.1.3.5.11 Elements of a Concentrator unit

Additional Proposed Changes

File Name	Description	Approved
Concentrator_Figure.jpg	Elements of a concentrator figure	

Statement of Problem and Substantiation for Public Input

This diagram supports the submission

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 135-NFPA 99-2015 [New Section after 5.1.3.8.5]	Parent

Submitter Information Verification

Submitter Full Name: MARK ALLEN
Organization: BEACON MEDAES
Street Address:
City:
State:
Zip:
Submittal Date: Mon May 25 12:48:58 EDT 2015

Committee Statement

Resolution: FR-609-NFPA 99-2015
Statement: This new section 5.1.3.9 defines the requirements for oxygen concentrator supplies. A typical supply for oxygen from concentrators is composed of three sub-sources, one or two of which are concentrators. This section defines that sub-source.

Public Input No. 385-NFPA 99-2015 [Section No. A.5.1.3.5.15]

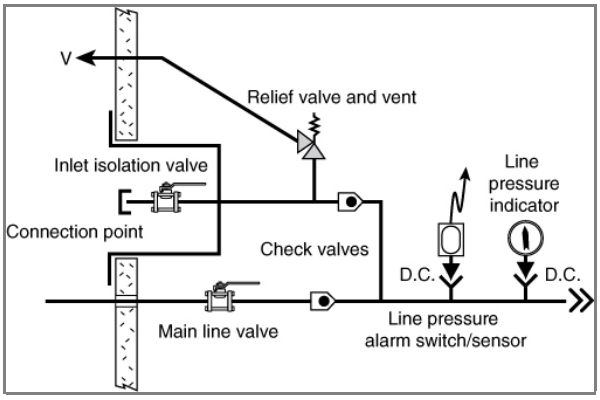
A.5.1.3.5.15

See Figure A.5.1.3.5.15.

If the relief valve on the emergency oxygen supply connection is moved downstream from the check valve in the emergency oxygen line, it should be connected to the system with a demand check fitting.

The emergency oxygen supply connection (EOSC) can be used as a part of the emergency operation plan (EOP) for an unplanned loss of oxygen supply. However, a risk assessment should be conducted by the facility to determine the contingency plan for vital life support and ~~critical care areas~~ Categroy 1 space . There might need to be interim measures for dealing with the loss of oxygen (e.g., high-pressure oxygen cylinders available for back feeding ~~critical care areas~~ Categroy 1 space).

Figure A.5.1.3.5.15 Emergency Oxygen Supply Connection.



Statement of Problem and Substantiation for Public Input

Definition for Critical Care Area is covered in NFPA 99: 3.3.137 Patient Care Space and is designated as Category 1 Space. Any references in NFPA 99 to “Critical Care Area” should be changed to “Category 1 Space”.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 357-NFPA 99-2015 [Section No. 3.3.28]	

Submitter Information Verification

Submitter Full Name: GARY BECKSTRAND
Organization: UTAH ELECTRICAL JATC
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jul 05 12:46:47 EDT 2015

Committee Statement

Resolution: FR-604-NFPA 99-2015
Statement: temrinology

Public Input No. 424-NFPA 99-2015 [Section No. A.5.1.3.5.15]

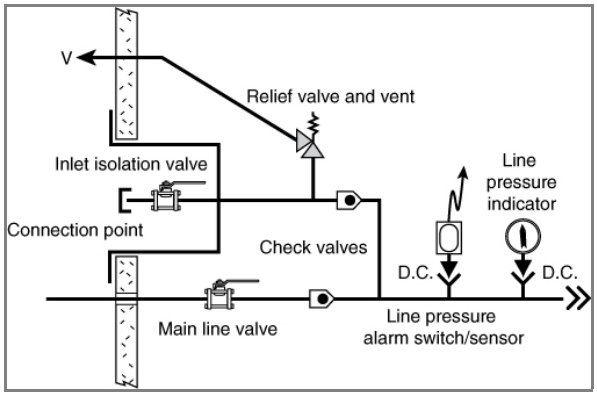
A.5.1.3.5.15

See Figure A.5.1.3.5.15.

If the relief valve on the emergency oxygen supply connection is moved downstream from the check valve in the emergency oxygen line, it should be connected to the system with a demand check fitting.

The emergency oxygen supply connection (EOSC) can be used as a part of the emergency operation plan (EOP) for an unplanned loss of oxygen supply. However, a risk assessment should be conducted by the facility to determine the contingency plan for vital life support and critical care areas. There might need to be interim measures for dealing with the loss of oxygen (e.g., high-pressure oxygen cylinders available for back feeding critical care areas).

Figure A.5.1.3.5.15 Emergency Oxygen Supply Connection.



Additional Proposed Changes

File Name	Description	Approved
A.5.1.3.5.15	Piping Detail	

Statement of Problem and Substantiation for Public Input

See Related PI for substantiation.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 423-NFPA 99-2015 [Section No. 5.1.3.5.15.2]	Annex Material

Submitter Information Verification

Submitter Full Name: JONATHAN WILLARD
Organization: ACUTE MEDICAL GAS SERVICES
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 12:25:17 EDT 2015

Committee Statement

Resolution: See Committee Statement on PI 423

Public Input No. 132-NFPA 99-2015 [New Section after A.5.1.3.8.1]

A-5.1.3.9 Oxygen Supply Systems Using Concentrator(s)

Additional Proposed Changes

File Name	Description	Approved
Oxygen_Concentrator_Supply_Source.jpg	Oxygen Concentrator Supply source diagram	

Statement of Problem and Substantiation for Public Input

The drawing in proposed A 5.1.3.9 will clarify the intent of new 5.1.3.9 A typical supply for oxygen from concentrators is composed of three sub-sources, one or two of which are typically concentrators.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 135-NFPA 99-2015 [New Section after 5.1.3.8.5]	Parent

Submitter Information Verification

Submitter Full Name: MARK ALLEN
Organization: BEACON MEDAES
Street Address:
City:
State:
Zip:
Submittal Date: Mon May 25 11:28:59 EDT 2015

Committee Statement

Resolution: FR-640-NFPA 99-2015

Statement: Oxygen concentrators are a technology which has reached the level of reliability, economics and clinical acceptance that facilities are beginning to install and operate them, particularly in many situations outside of the U.S. where traditional supplies are expensive, unreliable or simply unobtainable.

A series of revisions attempt to address this, drawing on the other international standards already in use as well as current practice with these supply sources, with adaptations appropriate to the conventions used in NFPA.

Also considered in the wording is an effort to assure that the common technologies now available (PSA and VSA) are both encompassed.

This section defines the common components required for the supply. The requirements draw primarily on the design of sources used elsewhere in the document and provide requirements for designs with duplex or triplex arrangemnet with appropriate alarms for each stage of the cascade. Other proposals deal with the various elements under this consolidated central supply source.

The one unusual characteristic of this proposal is provision of an automatic valve. This valve is necessary because one mode of failure for concentrators is to produce progressively lower concentration at the same pressure, which would contaminate the gas going to the pipeline, so it is necessary to immediately isolate the system in the event of low concentration.

Public Input No. 133-NFPA 99-2015 [New Section after A.5.1.3.8.1]

Annex A.5.1.3.9.2(2) Oxygen concentrators have inherent risks because they may not be able to instantaneously begin producing oxygen of the necessary concentration and quantity from a "cold start". For these reasons, cylinder header(s) are often preferable as one or more of the three sources. The cylinders will supply the system while the concentrator pressurizes and purges itself to the desired concentration of oxygen. Cylinders are also independent of electricity and can also provide a supply of oxygen in the event of power interruption.

Statement of Problem and Substantiation for Public Input

See new 5.1.3.9

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 135-NFPA 99-2015 [New Section after 5.1.3.8.5]	Parent

Submitter Information Verification

Submitter Full Name: MARK ALLEN
Organization: BEACON MEDAES
Street Address:
City:
State:
Zip:
Submittal Date: Mon May 25 11:37:06 EDT 2015

Committee Statement

Resolution: FR-640-NFPA 99-2015

Statement: Oxygen concentrators are a technology which has reached the level of reliability, economics and clinical acceptance that facilities are beginning to install and operate them, particularly in many situations outside of the U.S. where traditional supplies are expensive, unreliable or simply unobtainable.

A series of revisions attempt to address this, drawing on the other international standards already in use as well as current practice with these supply sources, with adaptations appropriate to the conventions used in NFPA.

Also considered in the wording is an effort to assure that the common technologies now available (PSA and VSA) are both encompassed.

This section defines the common components required for the supply. The requirements draw primarily on the design of sources used elsewhere in the document and provide requirements for designs with duplex or triplex arrangemnet with appropriate alarms for each stage of the cascade. Other proposals deal with the various elements under this consolidated central supply source.

The one unusual characteristic of this proposal is provision of an automatic valve. This valve is necessary because one mode of failure for concentrators is to produce progressively lower concentration at the same pressure, which would contaminate the gas going to the pipeline, so it is necessary to immediately isolate the system in the event of low concentration.

Public Input No. 134-NFPA 99-2015 [New Section after A.5.1.3.8.1]

Annex A.5.1.3.9.2 (5) The method used elsewhere in this document to provide these characteristics will be found in the final line regulator requirements under 5.1.3.5.5. This method would be suitable for Oxygen Supply Systems Using Concentrator(s) as well. However, the pressure differential between the output of the concentrator and the system line pressure is often very small, making the use of regulators problematic. In this case, alternate control arrangements (e.g. pressure control through variable speed drives) may be more effective.

Statement of Problem and Substantiation for Public Input

See proposed 5.1.3.9. This annex notes that peculiar characteristic of concentrators wherein they tend to operate best at lower pressures. Creating the required cascade between sources is therefore sometimes better done by methods other than a pressure cascade.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 135-NFPA 99-2015 [New Section after 5.1.3.8.5]	Parent

Submitter Information Verification

Submitter Full Name: MARK ALLEN
Organization: BEACON MEDAES
Street Address:
City:
State:
Zip:
Submittal Date: Mon May 25 11:38:44 EDT 2015

Committee Statement

Resolution: FR-640-NFPA 99-2015

Statement: Oxygen concentrators are a technology which has reached the level of reliability, economics and clinical acceptance that facilities are beginning to install and operate them, particularly in many situations outside of the U.S. where traditional supplies are expensive, unreliable or simply unobtainable.

A series of revisions attempt to address this, drawing on the other international standards already in use as well as current practice with these supply sources, with adaptations appropriate to the conventions used in NFPA.

Also considered in the wording is an effort to assure that the common technologies now available (PSA and VSA) are both encompassed.

This section defines the common components required for the supply. The requirements draw primarily on the design of sources used elsewhere in the document and provide requirements for designs with duplex or triplex arrangemnet with appropriate alarms for each stage of the cascade. Other proposals deal with the various elements under this consolidated central supply source.

The one unusual characteristic of this proposal is provision of an automatic valve. This valve is necessary because one mode of failure for concentrators is to produce progressively lower concentration at the same pressure, which would contaminate the gas going to the pipeline, so it is necessary to immediately isolate the system in the event of low concentration.

Public Input No. 295-NFPA 99-2015 [Section No. A.5.1.5]

A.5.1.5

Station outlets/inlets should be located at an appropriate height above the floor to prevent physical damage to equipment attached to the outlet. Station outlets and inlets listed and labeled in accordance with UL 1331, Station Inlets and Outlets, are suitable for distribution of nonflammable medical gas in rigid piping systems operating at standard operating pressures.

Statement of Problem and Substantiation for Public Input

UL 1331 was developed to provide the requirements for certifying station inlets and outlets for installation in accordance with NFPA 99. The standard includes construction and performance requirements, including the testing for external and seat leakage, endurance, operational pressure, hydrostatic strength, and accelerated aging. There are 18 manufacturers who have products listed in accordance with UL 1331.

Submitter Information Verification

Submitter Full Name: RONALD FARR
Organization: UL LLC
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jul 01 08:25:43 EDT 2015

Committee Statement

Resolution: NFPA 99 does not require that outlets/inlets be listed. There is no justification as to why this language is needed in the annex.

Public Input No. 386-NFPA 99-2015 [Section No. A.5.1.7]

A.5.1.7

It is the intent that surface-mounted medical gas rail systems would be permitted in individual patient rooms but would not be permitted to go directly through room walls to adjacent patient rooms. However, it is the intent to permit surface-mounted medical gas rails to be used in a given ~~critical care area~~ Categroy 1 space where there can be a partition separating certain patient care functions, essentially leaving the system within the given ~~critical care area~~ Categroy 1 space . As an example, two adjacent patient rooms outside of a ~~critical~~ Categroy 1 space care unit would not be permitted to have a surface-mounted medical gas rail interconnect between the two rooms through the wall. However, in a nursery where there might be one or two segregated areas for isolation, a medical gas rail system supplying more than one isolation room, but within the nursery area, would be permitted to be interconnected with the nursery system.

Statement of Problem and Substantiation for Public Input

Definition for Critical Care Area is covered in NFPA 99: 3.3.137 Patient Care Space and is designated as Category 1 Space. Any references in NFPA 99 to “Critical Care Area” should be changed to “Category 1 Space”.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 357-NFPA 99-2015 [Section No. 3.3.28]	

Submitter Information Verification

Submitter Full Name: GARY BECKSTRAND
Organization: UTAH ELECTRICAL JATC
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jul 05 12:48:40 EDT 2015

Committee Statement

Resolution: FR-604-NFPA 99-2015
Statement: temrinology

Public Input No. 387-NFPA 99-2015 [Section No. A.5.1.9.4(2)]

A.5.1.9.4(2)

Examples of ~~critical care areas~~ Category 1 space include post-anesthesia recovery, intensive care units, and emergency departments.

Statement of Problem and Substantiation for Public Input

Definition for Critical Care Area is covered in NFPA 99: 3.3.137 Patient Care Space and is designated as Category 1 Space. Any references in NFPA 99 to “Critical Care Area” should be changed to “Category 1 Space”.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 357-NFPA 99-2015 [Section No. 3.3.28]	

Submitter Information Verification

Submitter Full Name: GARY BECKSTRAND
Organization: UTAH ELECTRICAL JATC
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jul 05 12:50:44 EDT 2015

Committee Statement

Resolution: FR-604-NFPA 99-2015
Statement: temrinology

Public Input No. 388-NFPA 99-2015 [Section No. A.5.1.9.4.4(1)]

A.5.1.9.4.4(1)

This signal is intended to provide immediate warning for loss of, or increase in, system pressure for each individual vital life support and ~~critical care area~~ Categroy 1 space .

Statement of Problem and Substantiation for Public Input

Definition for Critical Care Area is covered in NFPA 99: 3.3.137 Patient Care Space and is designated as Category 1 Space. Any references in NFPA 99 to “Critical Care Area” should be changed to “Category 1 Space”.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 357-NFPA 99-2015 [Section No. 3.3.28]	

Submitter Information Verification

Submitter Full Name: GARY BECKSTRAND
Organization: UTAH ELECTRICAL JATC
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jul 05 12:52:13 EDT 2015

Committee Statement

Resolution: FR-604-NFPA 99-2015
Statement: temrinology

Public Input No. 160-NFPA 99-2015 [Section No. A.5.1.9.5]

A.5.1.9.5

Activation of any of the warning signals should immediately be reported to the department of the facility responsible for the medical gas piping system involved. If the medical gas is supplied from a bulk supply system, the owner or the organization responsible for the operation and maintenance of that system, usually the supplier, should also be notified. As much detail as possible should be provided. See Table A.5.1.9.5.

Table A.5.1.9.5 Requirements for Category 1 Local Alarms

Alarm Condition	Medical Air Compressors			Instrument Air Compressors	Medical–Surgical Vacuum Pumps	WAGD Producers
	Oil-less (Sealed Bearing) 5.1.3.6.3.4(A)(1)	Oil-Free (Separated) 5.1.3.6.3.4(A)(2)	Liquid Ring (Water-Sealed) 5.1.3.6.3.4(A)1			
~~Backup (lag) compressor in operation~~ Low Medical Air Reserve Capacity	5.1.3.6.3.12(F) 5.1.9.5.4(1)	5.1.3.6.3.12(F) 5.1.9.5.4(1)	5.1.3.6.3.12(F) 5.1.9.5.4(1)			
~~Backup (lag) medical–surgical vacuum pump in operation~~ Low Medical Vacuum Reserve Capacity					5.1.3.7.7 5.1.9.5.4(4)	
~~Backup (lag) WAGD producer in operation~~ Low WAGD Reserve Capacity						5.1.3.8.3.2 5.1.9.5.4(5)
~~Backup (lag) instrument air compressor in operation~~ Low Instrument Air Reserve Capacity				5.1.13.3.5.12(1) 5.1.9.5.4(1)		
Carbon monoxide high	5.1.3.6.3.13(2) 5.1.9.5.1(2)	5.1.3.6.3.13(2) 5.1.9.5.1(2)	5.1.3.6.3.13(2) 5.1.9.5.1(2)			
High discharge air temperature	5.1.3.6.3.12(D) 5.1.9.5.4(9)	5.1.3.6.3.12(E)(1) 5.1.9.5.4(9)				
High water in receiver	5.1.3.6.3.12(B) 5.1.9.5.4(7)	5.1.3.6.3.12(B) 5.1.9.5.4(7)	5.1.3.6.3.12(B) 5.1.9.5.4(7)			
High water in separator			5.1.3.6.3.12(C) 5.1.9.5.4(8)			
Medical air dew point high	5.1.3.6.3.13(1) 5.1.9.5.4(3)	5.1.3.6.3.13(1) 5.1.9.5.4(3)	5.1.3.6.3.13(1) 5.1.9.5.4(3)			
Instrument air dew point high				5.1.3.6.3.13(1) 5.1.9.5.4(6)		

Statement of Problem and Substantiation for Public Input

The standard was written around one type of control (on/off operation defined by pressure). Control methods for compressors and pumps are becoming more sophisticated and now can control on other conditions (e.g. flow) and in a variety of modes (e.g. continuous run with VSD). The proposed text attempts to account for these developments while preserving the performance characteristics inherent in the original text.

Submitter Information Verification

Submitter Full Name: MARK ALLEN
Organization: BEACON MEDAES
Street Address:
City:
State:
Zip:
Submittal Date: Mon May 25 13:51:06 EDT 2015

Committee Statement

Resolution:

Statement: The standard was written around one type of control (on/off operation defined by pressure). Control methods for compressors and pumps are becoming more sophisticated and now can control on other conditions (e.g. flow) and in a variety of modes (e.g. continuous run with VSD). The proposed text attempts to account for these developments while preserving the performance characteristics inherent in the original text.

Public Input No. 435-NFPA 99-2015 [Section No. A.5.3.3.6.1.3]

A.5.3.3.6.1.3

A color dew point monitor downstream of the receiver indicating the quality of air coming into the receiver is desirable.

A color dew point monitor in the main treatment facility is appropriate to help the staff promptly identify when the system is being degraded with air of a dew point higher than is acceptable.

The design of the color monitor should be such that the normal tolerance of variations will limit the maximum moisture at ~~3.9°C~~ ?°C at 690 kPag (~~39°F~~ ?°F at 100 psig) at activation.

Statement of Problem and Substantiation for Public Input

This is a placeholder for the Task Group #1 discussion.

Submitter Information Verification

Submitter Full Name: JONATHAN WILLARD
Organization: ACUTE MEDICAL GAS SERVICES
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 13:13:24 EDT 2015

Committee Statement

Resolution: The committee is open to receiving more research and analysis of dew point requirements. The discussion in the meeting resolved that there is not a clinical concern at any of the possible levels since for clinical applications, the air is needed to be humidifies regardless. The analysis should review what dew point levels can result in water in a pipeline or water causing mechanical damage.

Public Input No. 390-NFPA 99-2015 [New Section after A.6.1]

A.6.2.4 (NEW) _ Facilities in which the normal source of power is supplied by two or more separate central station-fed services experience greater than normal electrical service reliability than those with only a single feed. Such a dual source of normal power consists of two or more electrical services fed from separate generator sets or a utility distribution network that has multiple power input sources and is arranged to provide mechanical and electrical separation so that a fault between the facility and the generating sources is not likely to cause an interruption of more than one of the facility service feeders.

Statement of Problem and Substantiation for Public Input

Various recent Standards Council decisions have clearly established that NFPA 99, Health Care Facilities Code, is a performance code. These same Standards Council decisions have clearly established NFPA 70, National Electrical Code, as an installation code. This is consistent with each document's published scope. With this clear delineation established, NFPA 99, a performance code, cannot modify NFPA 70, an installation code. This modification cannot occur because NFPA 99, as a performance code, does not have jurisdiction over installation elements found in NFPA 70, or any other NFPA installation code. For this reason, certain elements of NFPA 70 must be written in NFPA 99.
NFPA 70: National Electrical Code 2014 517.35 (C) contains language similar to what is show above. This language should be contained in NFPA 99 as direction for location of essential electrical system components. This reference provides additional information intended for implementation in the appendix to accompany the PI for new additional language in 6.2.4 addressing design considerations protecting the essential electrical system that are critical for operation from both man made and natural catastrophe.
Recent natural weather events in the United States have exposed a design weakness in some facilities where redundant power was affected by flooding or other disasters effects. This provision will provide a reminder to all that location of power systems and fuel sources must not be affected by these events.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 389-NFPA 99-2015 [New Section after 6.2.3]	

Submitter Information Verification

Submitter Full Name: GARY BECKSTRAND
Organization: UTAH ELECTRICAL JATC
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jul 05 12:56:50 EDT 2015

Committee Statement

Resolution: FR-4-NFPA 99-2015
Statement: Various recent Standards Council decisions have clearly established that NFPA 99, Health Care Facilities Code, is a performance code. These same Standards Council decisions have clearly established NFPA 70, National Electrical Code, as an installation code. This is consistent with each document's published scope. With this clear delineation established, NFPA 99, a performance code, cannot modify NFPA 70, an installation code. This modification cannot occur because NFPA 99, as a performance code, does not have jurisdiction over installation elements found in NFPA 70, or any other NFPA installation code. For this re=ason, certain elements of NFPA 70 must be written in NFPA 99.

NFPA 70: National Electrical Code 2014 517.35 (C) contains language similar to what is show above. This language should be contained in NFPA 99 as direction for location of essential electrical system components. This particular reference provides for design considerations protecting the essential electrical system that are critical for operation from both manmade and natural catastrophe.

Recent natural weather events in the United States have exposed a design weakness in some facilities where redundant power was affected by flooding or other disasters effects. This provision will provide a reminder to all that location of power systems and fuel sources must not be affected by these events.

Public Input No. 313-NFPA 99-2015 [Section No. A.6.3.2.6]

A.6.3.2.6

Patient protection is provided primarily by an adequate grounding system. The ungrounded secondary of the isolation transformer reduces the cross-sectional area of grounding conductors necessary to protect the patient against voltage resulting from fault current by reducing the maximum current in case of a single probable fault in the grounding system. The line isolation monitor is used to provide warning when a single fault occurs. Excessive current in the grounding conductors will not result in a hazard to the patient unless a second fault occurs. If the current in the grounding system does not exceed 10 mA, even under fault conditions, the voltage across 3 m (9.84 ft) of No. 12 AWG wire will not exceed 0.2 mV, and the voltage across 3 m (9.84 ft) of No. 18 AWG grounding conductor in a flexible cord will not exceed 0.8 mV. Allowing 0.1 mV across each connector, the voltage between two pieces of patient-connected equipment will not exceed 2 mV.

The reference grounding point is intended to ensure that all electrically conductive surfaces of the building structure, which could receive heavy fault currents from ordinary (grounded) circuits, are grounded in a manner to bypass these heavy currents from the operating room.

Isolated power systems equipment listed and labeled in accordance with ANSI/UL 1047, Isolated Power Systems Equipment is suitable for installation and use in accordance with Section 6.3.2.6.

Statement of Problem and Substantiation for Public Input

This proposal is being provided as a convenience to the code user. UL 1047 requirements cover isolated power systems equipment rated 600 VAC or less, intended for installation and use in nonhazardous areas in health care facilities in accordance with the requirements in Article 517 of the National Electrical Code, NFPA 70, and in the Standard for Health Care Facilities, NFPA 99. Products covered include:
1. Isolated power centers, either cord-connected or permanently wired, consisting of a distribution panel that incorporates an isolation transformer, one or more isolated ungrounded secondary circuits terminating in integrally mounted grounding-type receptacles, a reference grounding bus bar, and line isolation monitor. Isolated power centers may have provision for connection of grounding conductors to remote grounding jacks, the room bonding points, and patient equipment grounding points. A permanently wired isolated power center may also have provision for connection to remote receptacles or indicators.
2. Convertible system units that facilitate a temporary conversion of the power supply for a power center from a grounded supply to an isolated supply.
3. Isolated power panelboards that incorporate the same features as permanently wired isolated power centers except that:
a. They may be supplied from remote isolation transformers, and
b. The secondary isolated circuits are intended to be connected by conduit to remotely located receptacles.
4. Wall modular units containing isolated power systems.
5. Cord-connected isolated power centers, and panels intended to supply x-ray equipment only.
The standard includes construction and performance requirements. There are 13 manufacturers who have products listed in accordance with UL 1047.

Submitter Information Verification

Submitter Full Name: RONALD FARR
Organization: UL LLC
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jul 02 11:58:57 EDT 2015

Committee Statement

Resolution: Nothing in the document prevent a listed system from being used. The proposed language does not add anything here.

Public Input No. 400-NFPA 99-2015 [Section No. A.7.3.3.1.2.1]

A.7.3.3.1.2.1

Patient care ~~areas~~ space and nursing unit support areas may contain many types of call stations with varying combinations of call initiation functions (e.g., code call, staff emergency, medical device alarm, help, assistance). A single call station can be equipped and configured to activate a single call type or a number of different call types, and may have bidirectional voice communication capability.

Statement of Problem and Substantiation for Public Input

The term "patent care area" is no longer used in NFPA 99. The term is replaced by "patent care space", see 3.3.127.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 397-NFPA 99-2015 [Section No. 11.3.3.1]	

Submitter Information Verification

Submitter Full Name: GARY BECKSTRAND
Organization: UTAH ELECTRICAL JATC
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jul 05 13:29:19 EDT 2015

Committee Statement

Resolution: FR-44-NFPA 99-2015
Statement: The term "patent care area" is no longer used in NFPA 99. The term is replaced by "patent care space", see 3.3.127.

Public Input No. 101-NFPA 99-2015 [Section No. A.10.2.3.6(2)]

A.10.2.3.6(2)

—

~~Whole-body hyperthermia/hypothermia units should be powered from a separate branch circuit.~~

Two possible means of meeting the requirement of this section:

1. use of a circuit breaker incorporated into the Multiple Outlet Connection rated at 75% of the ampacity rating of the flexible cord;

2. administrative actions (e.g. education, signs)

This list is not to suggest that other means are not acceptable.

Statement of Problem and Substantiation for Public Input

Although existing text has the word "should" in it, it is phrased as a definite recommendation and not explanatory material. Since it is not known in advance where Whole-body hyperthermia/hypothermia units will be used, every Operating Room and ICU room would require a dedicated branch circuit. I do not find this to be a reasonable recommendation.

This requirement has generated lots of confusion in the field as to how to comply. Suggested revised text may alleviate some of that confusion.

Submitter Information Verification

Submitter Full Name: ALAN LIPSCHULTZ
Organization: HEALTHCARE TECHNOLOGY CONSULTING LLC
Affilliation: (AAMI) Association for the Advancment of Medical Instrumentation
Street Address:
City:
State:
Zip:
Submittal Date: Wed May 06 10:16:12 EDT 2015

Committee Statement

Resolution: FR-501-NFPA 99-2015

Statement: This revision reaffirms the revisions adopted under TIA 15-1 (attached for convenience).

Change "Multiple Outlet Connections" to "Relocatable Power Taps" for consistency with other ANSI documents.

The word "pole-" has been added because the most common relocatable power tap configuration is securely attached to an IV pole that in turn supplies power to several devices in proximity to the IV pole. This combination is frequently used in Operating Rooms and Catheterization Labs where wall mounted power outlets are mounted far away from the patient. Utilization of these pole-mounted Relocatable Power Taps avoids multiple long power cords from snaking across the floor to the wall periphery outlets, thereby minimizing trip hazards.

Item (1) was revised and annex material added to clarify permissible attachment methods.

Item (4) was modified to ensure that the attachment method remains secure.

A.10.2.3.6(2): The existing annex material was deleted. Since it is not known in advance where whole-body hyperthermia/hypothermia units will be used, this issue has no bearing on meeting the 75% ampacity requirement. The 75% ampacity requirement has generated lots of confusion in the field as to how to comply. Suggested revised text may alleviate some of that confusion.

A.10.2.3.6(4) The existing annex material is irrelevant to the section to which it is attached and has therefore been deleted.

Public Input No. 104-NFPA 99-2015 [Section No. A.10.2.3.6(4)]

~~A.10.2.3.6(4)~~ —

~~See Chapter~~ 6 ~~for criteria of receptacles.~~

Statement of Problem and Substantiation for Public Input

The existing Appendix material is irrelevant to the section to which it is attached.

Submitter Information Verification

Submitter Full Name: ALAN LIPSCHULTZ
Organization: HEALTHCARE TECHNOLOGY CONSULTING LLC
Affilliation: AAMI (Association for the Advancement of Medical Instrumentation)
Street Address:
City:
State:
Zip:
Submittal Date: Wed May 06 11:57:53 EDT 2015

Committee Statement

Resolution: FR-501-NFPA 99-2015

Statement: This revision reaffirms the revisions adopted under TIA 15-1 (attached for convenience).

Change "Multiple Outlet Connections" to "Relocatable Power Taps" for consistency with other ANSI documents.

The word "pole-" has been added because the most common relocatable power tap configuration is securely attached to an IV pole that in turn supplies power to several devices in proximity to the IV pole. This combination is frequently used in Operating Rooms and Catheterization Labs where wall mounted power outlets are mounted far away from the patient. Utilization of these pole-mounted Relocatable Power Taps avoids multiple long power cords from snaking across the floor to the wall periphery outlets, thereby minimizing trip hazards.

Item (1) was revised and annex material added to clarify permissible attachment methods.

Item (4) was modified to ensure that the attachment method remains secure.

A.10.2.3.6(2): The existing annex material was deleted. Since it is not known in advance where whole-body hyperthermia/hypothermia units will be used, this issue has no bearing on meeting the 75% ampacity requirement. The 75% ampacity requirement has generated lots of confusion in the field as to how to comply. Suggested revised text may alleviate some of that confusion.

A.10.2.3.6(4) The existing annex material is irrelevant to the section to which it is attached and has therefore been deleted.

Public Input No. 401-NFPA 99-2015 [Section No. A.11.5.1.1.2]

A.11.5.1.1.2

Outside of a patient care ~~room~~ space , 11.5.1.1.2 prohibits sources of open flames within the site of intentional expulsion [1 ft (0.3 m)] of a nasal cannula. No sources of open flame are permitted within the area of administration [15 ft (4.3 m)] for other types of oxygen delivery equipment or in patient care rooms *(see 11.5.1.1.3)*.

The amount of oxygen delivered by a nasal cannula is limited. One foot (0.3 m) is sufficient separation from an oxygen-enriched atmosphere produced by a nasal cannula, which is oxygen delivery equipment used outside of patient care ~~areas~~ space . In the open air, dilution goes to ambient levels (not oxygen-enriched atmosphere) within a few inches of the cannula openings, but 12 in. (300 mm) provides an adequate safety factor. Other oxygen delivery equipment, such as masks, are not included since masks would not typically be associated with mobile patients in health care facilities and can deliver greater quantities of oxygen than nasal cannula.

The household-style nursing homes that include kitchens intended for residents' use and enclosed gas fireplaces present a source of flame ignition to which residents will be exposed. Residents utilizing a nasal cannula would potentially not be allowed to participate in the cooking because it would place the cooking flame within the site of intentional expulsion. However, they would be allowed in the kitchen area to assist in preparing the food and to socialize with other residents and staff in the kitchen similar to what happens in the kitchens of residential environments.

The primary concern is that flame-producing equipment exists in many places in a nursing home and that it would be impractical to maintain a resident with a nasal cannula a minimum of 15 ft (4.3 m) (Area of Administration) away from the flame-producing equipment. Typical flame-producing equipment found in a nursing home includes the following:

(1) Candles in chapels
(2) Open kitchens using gas cooking equipment
(3) Fireplaces
(4) Fuel-fired heating equipment
(5) Private family dining rooms using fuel-fired equipment
(6) Canned cooking fuel (e.g., used under chafing dishes)

Statement of Problem and Substantiation for Public Input

The term "patent care area" is no longer used in NFPA 99. The term is replaced by "patent care space", see 3.3.127.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 397-NFPA 99-2015 [Section No. 11.3.3.1]	

Submitter Information Verification

Submitter Full Name: GARY BECKSTRAND
Organization: UTAH ELECTRICAL JATC
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jul 05 13:31:04 EDT 2015

Committee Statement

Resolution: FR-516-NFPA 99-2015
Statement: This revision reaffirms the revisions incorporated under TIA 15-2 (attached for convenience).

The use of the term "patient care space" was used for consistency.

Public Input No. 231-NFPA 99-2015 [Section No. A.14.2.2.5]

A.14.2.2.5 .2

One common hazard of paint fires in ships is related to welding or burning operations on one side of a metal bulkhead that heats the metal to a point where the paint on the opposite side ignites. Most paints are not flammable when installed as thin layers over a substantial heat sink, such as the thick steel walls of a hyperbaric chamber, unless the walls are heated first. The same paints, when ground into a powder or installed over a very thin metal substrate, can burn readily. The paint selected for use in the interior walls of a hyperbaric chamber should be selected both for suitability to the requirements of the application and for its combustibility properties. The hazard of a fire increases as the amount of heat sink is reduced. Therefore, combustion is easier to achieve when paint is applied over thin materials and when there are multiple layers of paint. On thin section materials that are easily heated, care should be exercised in selecting the flammability characteristics of the paint and the amount of paint applied.

Statement of Problem and Substantiation for Public Input

The existing annex material is relevant to paragraph 14.2.2.5.2. When the content of section 14.2.2.5 was last changed, this annex material was not relocated accordingly.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 232-NFPA 99-2015 [Section No. 14.2.2.5.3]	

Submitter Information Verification

Submitter Full Name: ROBERT SHEFFIELD
Organization: INTERNATIONAL ATMO INC
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 23 15:07:30 EDT 2015

Committee Statement

Resolution: FR-341-NFPA 99-2015
Statement: The existing annex material is relevant to paragraph 14.2.2.5.2. This was not relocated properly when 14.2.2.5 was last changed.

Public Input No. 312-NFPA 99-2015 [Section No. A.14.2.4.5.3]

A.14.2.4.5.3 — The intent of this requirement is to allow facility staff to safely evacuate

~~the facility~~

a hyperbaric chamber and avoid breathing contaminated air.

~~This~~

This requirement is permitted to be met using either a self-contained breathing apparatus

~~, smoke hood with integral filter/air supply, or similar technology.~~

~~The number of units available should be adequate to meet facility staffing.~~

~~The breathing duration of the personal protection devices should be predicated upon the time necessary for evacuation of the facility.~~

~~Facility evacuation time~~

and/or a supplied air respirator.

- The Hyperbaric Safety Director should include all available resources when determining the number and design of the breathing apparatus(s). The number of chambers, type of chambers and normal/emergent operations will play a big role in his/her decision.
- **Evacuation time(s) from the chamber(s) should be determined during fire drills conducted by the**

~~hyperbaric facility.~~

- **Hyperbaric Safety Director.**
- It is not the intent of this requirement to have staff use equipment normally reserved for fire fighters. They are technical/clinical people supporting evacuation efforts until the fire department shows up.
- It is not the intent of this requirement to require the omission of all occupants' and staff's decompression obligation during the evacuation process. Based on the situation in real time, a facility may choose to delay evacuation until after all passengers' decompression obligation is met.
- It is not the intent of this requirement to exclude the use of smoke hoods with integral filter as a secondary system for extra staff to support the evacuation effort.

Statement of Problem and Substantiation for Public Input

Better match the Annex with the proposed changes to 14.2.4.5.3*
Respectfully submitted by:
William Davison, CHT (colorado@oxyheal.com)
Gregory Raleigh, CHT, RCP (raleigh.g@earthlink.net)

Submitter Information Verification

Submitter Full Name: WILLIAM DAVISON
Organization: OxyHeal Health Group
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jul 01 16:51:43 EDT 2015

Committee Statement

Resolution: The current annex material adequately addresses the code language as written. The related proposal to change the language was not made and the TC provided the following statement: The current language gives the end user flexibility to determine the best means to be provided for the specific situation. This is too limiting to require something with an air source in all instances. There is nothing in this paragraph that would not allow a person to provide a full air source. Designers and safety users can determine the appropriate protection depending on the specifics of their facility. The current annex note for this section covers this in some detail.

Public Input No. 347-NFPA 99-2015 [New Section after A.14.2.8.3.17]

Inert Gas Purging of Electrical Devices

A. 14.2.8.3.18

A.14.2.8.3.18.1

The intent of this section is to mitigate the risks of fire when an electrical device of any type is placed inside the chamber and put under pressure. The requirements of this section are not intended for things such as approved wrist watches and similar approved small battery powered devices.

A.14.2.8 .3.18.2

(1) Inert gas purging is only one element of the essential risk assessment and management that is critical to safely managing any electrical device that is introduced into the chamber. A comprehensive risk assessment with approved safety procedures and mitigation orders needs to be documented and signed by the medical director, safety director and all who are directly involved, prior to the device being used in the chamber. Available guides for risk assessment of electrical devices are listed in Annex B.14.2.8.3.19.1

(2) . Splitting a purge line to supply two or more devices can create a disparity of flow between the multiple gas lines depending on the length and resistance of each line. One device may be well protected with high flow and the other device under protected with very little flow. A single line with a single flowmeter will prevent this and give a measurable way to verify the correct flow to the device. . An inert gas flowmeter can be mistaken for an oxygen flowmeter. Each inert gas flowmeter needs to be clearly labled for the inert gas being used.

(3) Oxygen levels of 6% or less will not support combustion under normal clinical hyperbaric conditions. For initial testing, in order to establish the proper inert gas flow, oxygen levels in the electrical compartments of the device must be tested at all treatment pressures.

(4) Inert gas purging is useful for purging increased heat from the device. For initial testing, in order to establish the proper inert gas flow, temperature levels in the electrical compartments of the device must be tested at all treatment pressures.

(5) Maintaining inert gas pressure at all treatment levels can be accomplished by means of a tracking type regulator outside of the chamber or by placing the regulator inside the chamber with an adequate supply pressure for all treatment pressures.

(6) The chamber operator needs to be alerted to a loss of inert gas flow.

(7) Loss of inert gas to the purged device(s) creates a risks to patients and staff.

(8) Normal inert gas purging is unlikely to lower the oxygen level of the chamber atmosphere during hyperbaric oxygen treatments. However, because inert gas is being introduced into the chamber, an oxygen low alarm limit of 18% needs to be set.

(9) Acrylic boxes / enclosures are sometimes used to make inert gas purging easier. In the event of a fire or smoke inside this box there needs to be some means of drenching the inside device with water, specifically from the hand held hose.

(10) Chambers are made to be air tight. If the chamber doors are closed, for example over night, and the inert gas is inadvertently left on, there is a potential for the inert gas to accumulate inside the chamber to a dangerous level. This will deplete the oxygen level and becomes a hazard for anyone entering the chamber.

Statement of Problem and Substantiation for Public Input

This information is provided to help clarify the code and give a better understanding and knowledge regarding the intent and purpose of the code and inert gas purging.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 346-NFPA 99-2015 [New Section after 14.2.8.3.17.6]	

Submitter Information Verification

Submitter Full Name: WILLIAM GOSSETT
Organization: CONVERGENT, LLC
Street Address:
City:
State:
Zip:
Submittal Date: Sat Jul 04 19:22:30 EDT 2015

Committee Statement

Resolution: FR-325-NFPA 99-2015

Statement: Currently chapter 14 has only one mention of inert gas purging with no minimal requirements or guidelines listed in chapter 14 or the Annexes. This additional section is an attempt to introduce some minimal requirements and further safe practice guidelines in Annex B. The standard for allowable oxygen percentage in a purged device is stated in the notes of Annex B Table B.14.4 "Pressure Table" stating that "However, 6 percent oxygen in nitrogen will not support combustion, regardless of oxygen partial pressure".

Introducing an electrical device inside a chamber increases the risk of fire as stated in 14.2.8.3*. This is true even if the device is less than 120 VAC and under 2 amps. I would petition that this risk also applies to DC devices as well as all corded and cordless devices except as mentioned in 14.2.8.3.18.1.

Public Input No. 344-NFPA 99-2015 [New Section after A.14.2.9.2.1]

Oxygen Monitoring

A.14.2.9.4.2.2 Chamber atmospheres are typically not homogenous. Oxygen can accumulate in pools or pockets around patients with levels that are dangerously high. A single oxygen sample port inside the chamber may not be sufficient to detect increased oxygen levels in another area of the chamber. In this case, a serious increase of oxygen, well above the allowed level of 23.5 percent, goes undetected. Requiring at least two sample ports provides an increased standard for better assessment the oxygen levels inside the chamber. The requirement for a dedicated oxygen analyzer on each line is to prevent false and unsafe readings from two or more sample lines feeding into one oxygen sensor. For example: one sample line may come from an area of 21 percent and the other line come from an area of 50 percent or more. Both lines coming together will mix and give a false low oxygen reading. Having a dedicated oxygen monitor for each sample line will avoid this unsafe situation.

A.14.2.9.4.2.4 The ability to spot check for oxygen leaks and or oxygen pooling is essential for the safe management of oxygen levels. If the minimum 10 second response time required in 14.2.9.4.2.3 is not compromised, the extension or "snooping wand" can be left (in place) connected for easy use.

Statement of Problem and Substantiation for Public Input

Explanation notes given for these two Annex A areas will help give better understanding and education as well as increasing the awareness of potentially serious unsafe scenarios.

Submitter Information Verification

Submitter Full Name: WILLIAM GOSSETT
Organization: CONVERGENT, LLC
Street Address:
City:
State:
Zip:
Submittal Date: Sat Jul 04 14:22:02 EDT 2015

Committee Statement

Resolution: FR-328-NFPA 99-2015

Statement: Language has been specified to make it clear that the reasoning for this requirement is specific for nitrogen and is not meant to be applied where air is used.

A minimum response time has been added because long sample lines, with low flows, such as 0.5 LPM, will take a long time to reach the sensor head.

Oxygen pooling is a serious concern that seems to be often overlooked. The requirement for a removable extension should help increase the awareness of oxygen pooling and give the proper tool to troubleshoot and resolve areas of pooling. The Annex A asterisk will increase understanding and awareness.

Public Input No. 508-NFPA 99-2015 [Section No. A.14.2.9.8]

A.14.2.9. ~~8~~ 1.3

It is recommended that information about the status of an anesthetized or otherwise monitored patient be transmitted to the inside chamber attendants via the intercommunications system. As an alternative, the monitor indicators can be placed adjacent to a chamber viewport (or viewports) for direct observation by inside personnel.

Statement of Problem and Substantiation for Public Input

This annex note deals with information from monitoring equipment. It fits better with 14.2.9.1.3 than 14.2.9.8.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 500-NFPA 99-2015 [Section No. 14.2.9.8]	Relocating a requirement and an annex note to different locations.

Submitter Information Verification

Submitter Full Name: Kevin Posey
Organization: International ATMO, Inc.
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 16:56:44 EDT 2015

Committee Statement

Resolution: ACCEPT RELOCATION

Public Input No. 527-NFPA 99-2015 [Section No. A.14.3.2.1.6]

A.14.3. ~~2.~~ 1. ~~6~~ 5.9

The use of paper should be kept to an absolute minimum in hyperbaric chambers.

Statement of Problem and Substantiation for Public Input

Renumbering of annex note to coincide with relocation of requirement.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 525-NFPA 99-2015 [Section No. 14.3.2.1.6]	

Submitter Information Verification

Submitter Full Name: Kevin Posey
Organization: International ATMO, Inc.
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 17:45:39 EDT 2015

Committee Statement

Resolution: FR-338-NFPA 99-2015
Statement: This requirement is out of place currently and is better located in the general materials section.

Public Input No. 530-NFPA 99-2015 [Section No. A.14.3.6.4]

A.14.3. ~~6.4~~ 8

It is absolutely essential that all areas of, and components associated with, the hyperbaric chamber be kept meticulously free of grease, lint, dirt, and dust.

Statement of Problem and Substantiation for Public Input

Renumbering of annex note to coincide with requirement.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 529-NFPA 99-2015 [Section No. 14.3.6.4]	

Submitter Information Verification

Submitter Full Name: Kevin Posey
Organization: International ATMO, Inc.
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 17:58:14 EDT 2015

Committee Statement

Resolution: FR-340-NFPA 99-2015
Statement: This revision is intended to compile all ITM requirements in one location. This includes relocating the provisions previously located in 14.2.5.5 and 14.2.9.6.1.

Public Input No. 343-NFPA 99-2015 [Section No. B.14.2.1]

B.14.2.1 Fire Inside Chamber.

For fire inside the chamber the following procedures should be performed:

(1) *Inside Observer:*

(2) _ Activate fire suppression system and/or hand-held hoses.

(3) _ Advise outside.

(4) _ Don breathing air mask.

(5) *Chamber Operator:*

(6) _ Activate the fire suppression system, if needed.

(7) _ Switch breathing gas to air.

(8) _ Decompress the chamber as rapidly as possible.

(9) *Medical Personnel (Outside):*

(10) _ Direct operations and assist crew members wherever necessary.

(11) _ Provide medical support as required.

(12) *Other Personnel (Outside):*

(13) _ Notify the fire department by activating fire signaling device.

(14) _ Stand by with a fire extinguisher (preferably deionized water extinguisher) .

(15) _ Assist in unloading chamber occupants.

Statement of Problem and Substantiation for Public Input

B.14.2.1 (4) (b) In Annex A.14.2.5.1.5 it is explained how valuable time can be lost trying to "snuff out" a hyperbaric oxygen fire with conventional fire extinguishers. It explains that this is "not effective in controlling fires in oxygen-enriched atmospheres." Sprayed water is recognized as the best medium for extinguishing an oxygen enriched fire. Deionized water extinguishers are now available with proper spray heads for extinguishing fires verses the old straight stream water extinguishers. Deionized water is also safe for the user to use on electrical equipment and not be shocked or electrocuted. Deionized water is a safer medium to spray on a patient who may have need of post burn treatment. Other extinguishing mediums may leave undesirable residual power. Deionized water and halotron extinguishers are, to my understanding, the only two types of extinguishers used in hospitals that are considered clean for outside the chamber. Powder extinguishers can leave a residual all over the department that can destroy other electrical equipment in the immediate area. One leading national hospital that I am aware of has replaced all of their power extinguishers for deionized water extinguishers in all of their MRI areas for this reason.

Submitter Information Verification

Submitter Full Name: WILLIAM GOSSETT
Organization: CONVERGENT, LLC
Street Address:
City:
State:
Zip:
Submittal Date: Sat Jul 04 14:09:06 EDT 2015

Committee Statement

Resolution: This change would contradict with the fact that the code now requires and ABC extinguisher be provided. There is no preference for a specific extinguisher.

Public Input No. 411-NFPA 99-2015 [New Section after B.14.2.2]

Inert Gas Purging

B.14.2.8.3.17.7

Inert gas purging is a means to mitigate the risk of fire initiating from an electrical device brought into the chamber. The three main objectives to inert gas purging are to lower the oxygen level to 6% or less, purge increased heat from the device and to help prevent dust accumulation inside the device. Fire research has demonstrated that under normal conditions a combustion will not take place when the oxygen level is at 6% or less. This is regardless of the treatment pressure and is more related to the ratio of oxygen to the inert gas. With an oxygen level of 6% and the balancing inert gas level at 94%, the high percentage of inert gas will prevent combustion.

A clear policy and procedure should be written for the inert gas purging systems and include the inert gas parameters for each device and the proper set up of the system.

All testing to determine the proper inert gas flow should be well documented and included in the approved and unapproved documentation. Approval signatures need to be obtained from the medical director and the safety director at minimum. Other signatures should include the department manager and biomed representatives.

Start-up and shut-down checklist need to include inert gas parameters with visual checks and verifications of inside devices, inert gas equipment and alarms.

Statement of Problem and Substantiation for Public Input

This information is given to increase the awareness and understanding of the code and of inert gas purging techniques.

Submitter Information Verification

Submitter Full Name: WILLIAM GOSSETT
Organization: CONVERGENT, LLC
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 00:14:11 EDT 2015

Committee Statement

Resolution: FR-325-NFPA 99-2015

Statement: Currently chapter 14 has only one mention of inert gas purging with no minimal requirements or guidelines listed in chapter 14 or the Annexes. This additional section is an attempt to introduce some minimal requirements and further safe practice guidelines in Annex B. The standard for allowable oxygen percentage in a purged device is stated in the notes of Annex B Table B.14.4 "Pressure Table" stating that "However, 6 percent oxygen in nitrogen will not support combustion, regardless of oxygen partial pressure".

Introducing an electrical device inside a chamber increases the risk of fire as stated in 14.2.8.3*. This is true even if the device is less than 120 VAC and under 2 amps. I would petition that this risk also applies to DC devices as well as all corded and cordless devices except as mentioned in 14.2.8.3.18.1.

Public Input No. 341-NFPA 99-2015 [Section No. B.14.3]

B.14.3 Suggested Procedures for Hyperbaric Chamber Operator to Follow in the Event of Fire in a Class B ~~Chambers~~ Chamber room .

B.14.3.1

For fires within the facility not involving the chamber, the following procedure should be performed:

(1) If there is smoke in the area, don the operator's source of breathable gas per 14 .2.4.5.3*.

(2) Decompress the chamber. The urgency of decompression should be determined by the location of the fire.

(3) Remove the patient and evacuate to safe area.

(4) Turn off the oxygen zone valve to the chamber room and close any smoke/fire barrier doors. These steps are consistent with the Rescue and Confine elements of the Rescue, Alarm, Confine, Extinguish (R.A.C.E.) procedure. It is assumed that other personnel will evacuate other patients and visitors from the area and activate a fire alarm signaling device (if not already activated).

B.14.3.2

For fire within the chamber, the following procedure should be performed:

(1) Stop oxygen from flowing into the chamber by switching off the chamber (if the chamber is compressed with oxygen) or switching the supply gas of a breathing device from oxygen to air (if the chamber is compressed with air).

(2) Decompress the chamber as rapidly as possible following the emergency decompression procedures .

(3) Stand by with a hand-held fire extinguisher (perferably a de-ionized water extinguisher) and spray into the chamber (if necessary) when the chamber door is opened.

(4) Remove the patient and evacuate to a safe area.

(5) Turn off the oxygen zone valve to the chamber room and close any smoke/fire barrier doors.

These steps are consistent with the Rescue and Confine elements of the Rescue, Alarm, Confine, Extinguish (R.A.C.E.) procedure. It is assumed that other personnel will evacuate other patients and visitors from the area and activate a fire alarm signaling device (if not already activated). The injured patient should have appropriate medical attention immediately after evacuation to a safe area. Many Class B chambers require oxygen supply pressure to operate a rapid decompression feature. If this is the case, do not turn off the oxygen zone valve or any inline oxygen supply shutoff valve until all patients have been removed from the chamber(s).

Statement of Problem and Substantiation for Public Input

B.14.3 The current wording is somewhat confusing stating "Event of Fire in Class B Chambers." which could be taken to mean a fire INSIDE a Class B Chamber.

B.14.3.2(3) In Annex A.14.2.5.1.5 it is explained how valuable time can be lost trying to "snuff out" a hyperbaric oxygen fire with conventional fire extinguishers. It explains that this is "not effective in controlling fires in oxygen-enriched atmospheres." Sprayed water is recognized as the best medium for extinguishing an oxygen enriched fire. Deionized water extinguishers are now available with proper spray heads for extinguishing fires verses the old straight stream water extinguishers. Deionized water is also safe for the user to use on electrical equipment and not be shocked. Deionized water is a safer medium to spray on a patient who may have need of post burn treatment. Other extinguishing mediums may leave undesirable residual power. Deionized water and halotron extinguishers are, to my understanding, the only two types of extinguishers used in hospitals that are considered clean. Powder extinguishers can leave a residual all over the department that can destroy other electrical equipment in the immediate area. One leading national hospital that I am aware of has replaced all of their power extinguishers for deionized water extinguishers in all of their MRI areas for this reason.

Submitter Information Verification

Submitter Full Name: WILLIAM GOSSETT
Organization: CONVERGENT, LLC
Street Address:
City:
State:
Zip:
Submittal Date: Sat Jul 04 13:36:44 EDT 2015

Committee Statement

Resolution: FR-339-NFPA 99-2015

Statement: The title of B.14.3 was revised to clarify that this guidance is for fires in facilities with Class B chambers, and nor fires in Class B chambers themselves.

The wording of this annex section has been revised to better correlate with the language now used in Chapter 14.

Public Input No. 7-NFPA 99-2015 [Section No. D.1.2]

D.1.2 Other Publications.

D.1.2.1 ACS Publications.

American College of Surgeons, 633 N. Saint Clair Street, Chicago, IL 60611-3211.

04–GR-0001, *Guidelines for Optional Ambulatory Surgical Care and Office-Based Surgery*, 2000.

D.1.2.2 ASHRAE Publications.

ASHRAE, 1791 Tullie Circle, NE, Atlanta, GA 30329-2305.

ASHRAE Handbook ~~of~~ - Fundamentals, ~~2001~~ **2013** .

ASHRAE Guideline 0, *The Commissioning Process*, ~~2005~~ **2013** .

ASHRAE Guideline 1.1, *HVAC&R Technical Requirements for the Commissioning Process*, 2007**, 2012 Errata** .

D.1.2.3 ASME Publications.

~~American Society of Mechanical Engineers~~ **ASME International** , Two Park Avenue, New York, NY 10016-5990.

ASME B16.22, *Wrought Copper and Copper Alloy Solder Joint Pressure Fitting*, ~~2001~~ **2013** .

~~ANSI/~~ ASME B16.50, *Wrought Copper and Copper Alloy Braze- Joint Pressure Fitting*, ~~2001~~ **2013** .

ASME Boiler and Pressure Vessel Code , ~~2001~~ **2015** .

D.1.2.4 ASSE Publications.

American Society of Sanitary Engineering, 901 Canterbury Road, Suite A, Westlake, OH 44145-1480.

ASSE 6040, *Professional Qualification Standard for Medical Gas Maintenance Personnel*, ~~2001~~ **2012** .

D.1.2.5 ASTM Publications.

ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959.

ASTM ~~E 119~~ E119 , *Standard Test Method for Fire Tests of Building Construction and Materials,*~~2012~~ 201**4** .

ASTM ~~G 63~~ G63 , *Standard Guide for Evaluating Nonmetallic Materials for Oxygen Service*, **1999, Reapproved 2007** .

ASTM ~~G 88~~ G88 , *Standard Guide for Designing Systems for Oxygen Service*, ~~2005~~ **2013** .

ASTM ~~G 93~~ G93 , *Standard Practice for Cleaning Methods and Cleanliness Levels for Material and Equipment Used in Oxygen-Enriched Environments*, ~~1999 (2007)~~ **2003, Reapproved 2011 .**

ASTM ~~G 94~~ G94 , *Standard Guide for Evaluating Metals for Oxygen Service*, 2005**, Reapproved 2014** .

D.1.2.6 CGA Publications.

Compressed Gas Association, ~~4221 Walney Road, 5th Floor~~ **14501 George Carter Way, Suite 103** , Chantilly, VA 20151-2923.

CGA G-8.1, *Standard for Nitrous Oxide Systems ~~at Consumer~~ at **Customer** Sites*, ~~1990~~ **2013** .

CGA P-2.7, *Guide for the Safe Storage, Handling, and Use of Small Portable Liquid Oxygen Systems in Health Care Facilities*, 2011.

CGA V-1, *Standard for Compressed Gas Cylinder Valve Outlet and Inlet Connections* ~~(ANSI B57.1), 1994~~ **, 2013** .

D.1.2.7 FGI Publications.

Facility Guidelines Institute, 1919 McKinney Avenue, Dallas, TX 75201.

Guidelines for Design and Construction of Hospitals and Outpatient Facilities, 2014.

D.1.2.8 IEC Publications.

International Electrotechnical Commission, 3, rue de Varembé, P.O. Box 131, CH-1211 Geneva 20, Switzerland.

~~ANSI/~~ **IEC** ~~/ISO 80001~~ 80001 -1-1, **Application of Risk Management** ~~of Medical~~ **for IT-Networks Incorporating Medical Devices - Part 1: Roles , Responsibilities, and Activities, 2010** ~~.ANSI/~~

IEC/ ~~ISO 80001~~ **TR** 80001 -2-5, ~~Guidance for the~~ **Application of Risk Management** ~~of Distributed Alarm Systems Utilizing Medical~~ **for IT-Networks** , ~~2010~~ **incorporating Medical Devices - Part 2-5: Application Guidance - Guidance for Distrubuted Alarm Systems, 2014** .

IEC , 60601-1-1, *Medical Electrical Equipment — Part 1: General Requirements for Basic Safety and Essential Performance*, ~~2007~~ **2014** .

IEC 60601-1-2 *Medical Electrical Equipment – Part 1-2: General Requirements for Safety – Collateral Standard: Electromagnetic Compatibility – Requirements and Tests*, ~~2007~~ **2014** .

D.1.2.9 IEEE Publications.

IEEE, Three Park Avenue, 17th Floor, New York, NY 10016-5997.

~~ANSI/~~ IEEE 493-~~2007~~ , *Recommended Practice for the Design of Reliable Industrial and Commercial Power System*, 2007.

IEEE 602, *Recommended Practice for Electric Systems in Health Care Facilities,* 2007.

D.1.2.10 Ocean Systems, Inc. Publications.

Ocean Systems, Inc., Research and Development Laboratory, Tarrytown, NY 10591. Work carried out under U.S. Office of Contract No. N00014-67-A-0214-0013.

Ocean Systems, Inc., "Technical Memorandum UCRI-721, Chamber Fire Safety." (Figure A.3.3.11.2 is adapted from Figure 4, "Technical Memorandum UCRI-721, Chamber Fire Safety," T. C. Schmidt, V. A. Dorr, and R. W. Hamilton, Jr., Ocean Systems, Inc., Research and Development Laboratory, Tarrytown, NY 10591. Work carried out under US Office of Naval Research, Washington, DC, Contract No. N00014-67-A-0214-0013.) (G. A. Cook, R. E. Meierer, and B. M. Shields, "Screening of Flame-Resistant Materials and Comparison of Helium with Nitrogen for Use in Dividing Atmospheres." First summary report under ONR Contract No. 0014-66-C-0149. Tonawanda, NY: Union Carbide, 31 March 1967. DDC No. Ad-651583.)

D.1.2.11 SAE Publications

~~Society of Automotive Engineers~~ **SAE International** , 400 Commonwealth Drive, Warrendale, PA 15096.

SAE AMS**-** QQ-N290, *Nickel Plating (Electrodeposited)*, **Reinstated** 2009.

D.1.2.12 TIA Publications.

Telecommunications Industry Association, 2500 Wilson Boulevard, Suite 300, Arlington, VA 22201.

TIA/EIA 569-B, *Commercial Building Standard for Telecommunications Pathways and Spaces,* 2004. **(Superseded by TIA Wiring Standards in PI-6)**

D.1.2.13 UL Publications.

Underwriters Laboratories Inc., 333 Pfingsten Road, Northbrook, IL 60062-2096.

UL 263, *Fire Resistance Ratings*, 2011.

~~ANSI/~~ UL 1069, *Safety Standard for Hospital Signaling and Nurse Call Equipment*, 2012.

D.1.2.14 U.S. Government Publications.

U.S. ~~Government Printing~~ Government **Publishing** Office, Washington, DC 20402.

"Crisis Standards of Care: A Systems Framework for Catastrophic Disaster Response," Institute of Medicine (IOM) Report, 2012.

Medical Surge Capacity and Capability Handbook, Department of Health and Human Services, 2007

D.1.2.15 Other Publications.

Statement of Problem and Substantiation for Public Input

Referenced current SDO names, addresses, standard names, numbers, and editions.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 6-NFPA 99-2015 [Section No. 2.3]	Referenced current SDO names, addresses, standard names, numbers, and editions.
Public Input No. 5-NFPA 99-2015 [Global Input]	
Public Input No. 15-NFPA 99-2015 [Section No. D.2]	

Submitter Information Verification

Submitter Full Name: Aaron Adamczyk
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Mon Feb 09 19:53:02 EST 2015

Committee Statement

Resolution: See First Revision No. 102
Statement: Annex D referenced documents have been updated to show the most current editions.

Public Input No. 277-NFPA 99-2015 [Section No. D.1.2.5]

D.1.2.5 ASTM Publications.

ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959.

ASTM E 119, *Standard Test Method for Fire Tests of Building Construction and Materials*,~~2012~~ 2014 .

ASTM G 63, *Standard Guide for Evaluating Nonmetallic Materials for Oxygen Service*, 2007.

ASTM G 88, *Standard Guide for Designing Systems for Oxygen Service*, 2005.

ASTM G 93, *Standard Practice for Cleaning Methods and Cleanliness Levels for Material and Equipment Used in Oxygen-Enriched Environments*, 1999 (2007).

ASTM G 94, *Standard Guide for Evaluating Metals for Oxygen Service*, 2005.

Statement of Problem and Substantiation for Public Input

date update

Submitter Information Verification

Submitter Full Name: MARCELO HIRSCHLER
Organization: GBH INTERNATIONAL
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jun 29 21:22:05 EDT 2015

Committee Statement

Resolution: See First Revision No. 102
Statement: Annex D referenced documents have been updated to show the most current editions.

Public Input No. 455-NFPA 99-2015 [Section No. D.1.2.9]

D.1.2.9 IEEE Publications.

IEEE, Three Park Avenue, 17th Floor, New York, NY 10016-5997.

ANSI/IEEE 493-2007, *Recommended Practice for the Design of Reliable Industrial and Commercial Power System*, 2007.

IEEE 602, *Recommended Practice for Electric Systems in Health Care Facilities,* 2007

3001 . 7 Recommended Practice for the Application of Communication and Signaling Systems used in Industrial and Commercial Power Systems

P3003.2 Recommended Practice for the System Grounding of Industrial and Commercial Power Systems (P)

3004.13 Recommended Practice for Overcurrent Coordination in Industrial and Commercial Power Systems

P3005.4 Recommended Practice for Improving the Reliability of Emergency and Stand-By Power Systems

P3006.2 Recommended Practice for Evaluating the Reliability of Existing Industrial and Commercial Power Systems (P)

3006.5 Recommended Practice for the Use of Probability Methods for Conducting a Reliability Analysis of Industrial and Commercial Power Systems

Statement of Problem and Substantiation for Public Input

These are the titles of the replacements for the IEEE Color Book series.

Submitter Information Verification

Submitter Full Name: MICHAEL ANTHONY
Organization: UNIVERSITY OF MICHIGAN
Affilliation: IEEE Education & Healthcare Facilities Committee
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 14:40:41 EDT 2015

Committee Statement

Resolution: See First Revision No. 102
Statement: Annex D referenced documents have been updated to show the most current editions.

Public Input No. 296-NFPA 99-2015 [Section No. D.1.2.13]

D.1.2.13 UL Publications.

Underwriters Laboratories Inc., 333 Pfingsten Road, Northbrook, IL 60062-2096.

UL 263, *Fire Resistance Ratings*, 2011.

ANSI/UL 1069, *Safety Standard for Hospital Signaling and Nurse Call Equipment*, ~~2012.~~ 2007, Revised 2015

UL 1331, *Station Inlets and Outlets,* 2005, Revised 2014

ANSI/UL 1047, Isolated Power Systems Equipment, 2010

Statement of Problem and Substantiation for Public Input

UL 1331 was developed to provide the requirements for certifying station inlets and outlets for installation in accordance with NFPA 99. The standard includes construction and performance requirements, including the testing for external and seat leakage, endurance, operational pressure, hydrostatic strength, and accelerated aging. There are 18 manufacturers who have products listed in accordance with UL 1331. This also updates reference to the most current edition of UL 1069.

This proposal is being provided as a convenience to the code user. UL 1047 requirements cover isolated power systems equipment rated 600 VAC or less, intended for installation and use in nonhazardous areas in health care facilities in accordance with the requirements in Article 517 of the National Electrical Code, NFPA 70, and in the Standard for Health Care Facilities, NFPA 99. Products covered include:

1. Isolated power centers, either cord-connected or permanently wired, consisting of a distribution panel that incorporates an isolation transformer, one or more isolated ungrounded secondary circuits terminating in integrally mounted grounding-type receptacles, a reference grounding bus bar, and line isolation monitor. Isolated power centers may have provision for connection of grounding conductors to remote grounding jacks, the room bonding points, and patient equipment grounding points. A permanently wired isolated power center may also have provision for connection to remote receptacles or indicators.
2. Convertible system units that facilitate a temporary conversion of the power supply for a power center from a grounded supply to an isolated supply.
3. Isolated power panelboards that incorporate the same features as permanently wired isolated power centers except that:
   a. They may be supplied from remote isolation transformers, and
   b. The secondary isolated circuits are intended to be connected by conduit to remotely located receptacles.
4. Wall modular units containing isolated power systems.
5. Cord-connected isolated power centers, and panels intended to supply x-ray equipment only.

The standard includes construction and performance requirements. There are 13 manufacturers who have products listed in accordance with UL 1047.

Submitter Information Verification

Submitter Full Name: RONALD FARR
Organization: UL LLC
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jul 01 08:29:29 EDT 2015

Committee Statement

Resolution: UL 1331 was not added to the annex by HEA-PIP. Annex D.1 is reserved only for those publications referenced in the annex of the document. UL 1047 is not referenced anywhere in the code or annex and is therefore not appropriate to be included in this section for the reason stated above.

Public Input No. 15-NFPA 99-2015 [Section No. D.2]

D.2 Informational References.

The following documents or portions thereof are listed here as informational resources only. They are not a part of the requirements of this document.

D.2.1 Published Articles on Fire Involving Respiratory Therapy Equipment and Related Incidents.

Benson, D. M., and Wecht, C. H. Conflagration in an ambulance oxygen system. *Journal of Trauma*, vol. 15, no. 6:536-649, 1975.

Dillon, J. J. Cry fire! *Respiratory Care*, vol. 21, no. 11:1139-1140, 1976.

Gjerde, G. E., and Kraemer, R. An oxygen therapy fire. *Respiratory Care*, vol. 25, no. 3 3:362-363, 1980.

Walter, C. W. Fire in an oxygen-powered respirator. *JAMA* 197:44-46, 1960.

Webre, D. E., Leon, R., and Larson, N.W. Case History; Fire in a nebulizer. *Anesthesia and Analgesia* 52:843-848, 1973.

D.2.2 References for A.10.2.13.4.3.

Dalziel, C. F., and Lee, W. R., Reevaluation of lethal, electric currents effects of electricity on man. *Transactions on Industry and General Applications*, vol. IGA-4, no. 5, September/October 1968.

Roy, O. A., Park, G. R., and Scott, J. R., Intracardiac catheter fibrillation thresholds as a function of duration of 60 Hz current and electrode area. *IEEE Trans. Biomed. Eng.* BME 24:430-435, 1977.

Roy, O. A., and Scott, J. R., 60 Hz ventricular fibrillation and pump failure thresholds versus electrode area. *IEEE Trans. Biomed. Eng.* BME 23:45-48, 1976.

Watson, A. B., Wright, J. S., and Loughman, J., Electrical thresholds for ventricular fibrillation in man. *Med. J. Australia* 1:1179-1181, 1973.

Weinberg, D. I., et al., Electric shock hazards in cardiac catheterization. *Elec. Eng.* 82:30-35, 1963.

D.2.3 References for A.14.3.1.5.4.3.

NASA BMS Document GRC-M8300.001. (2005). Ch. 5, Para. 5.6.3.

Raleigh, G., et al. (2005). *Air-Activated Chemical Warming Devices: Effects of Oxygen and Pressure*. Undersea Hyper Med, 32(6).

Workman, W.T. (1999). *Hyperbaric Facility Safety: A Practical Guide* (p. 531). Flagstaff (AZ): Best Publishing.

Kindwall, E.P., & Whelan, H.T. (2004). *Hyperbaric Medicine Practice* (p. 86). Flagstaff (AZ): Best Publishing.

Burman, F. (2006). *Risk Assessment Guide for the Installation and Operation of Clinical Hyperbaric Facilities*; 4th edition. San Antonio (TX): International ATMO.

D.2.4 Addresses of Other Organizations that Publish Standards or Guidelines.

American Conference of Governmental Industrial Hygienists, 1330 Kemper Meadow Drive, Cincinnati, OH 45240-1634.

American Industrial Hygiene Assoc., ~~475 Wolf Ledges Parkway, Akron, OH 44311~~ **3141 Fairview Park Dr., Suite 777** , **Falls Church, VA 22042** .

Department of Health and Human Services, ASPR, National Disaster Medical System (NDMS), http://www.phe.gov/preparedness/responders/ndms/ ~~pages~~ **P** ages /default.aspx .

George Washington University, School of Engineering and Applied Sciences, Institute for Crisis, Disaster and Risk Management. *Medical and Health Incident Management (maHim) System: A Comprehensive Functional System Description for Mass Casualty Medical and Health Incident Management*, http://www.seas.gwu.edu/~icdm/MaHIM%20V2%20final%20report%20sec%202.pdf.

National Emergency Management Association, Council of State Governments, Lexington, KY, Emergency Management Assistance Compact, http://www.emacweb.org/emac/index.cfm?CFID=5327&CFTOKEN=28115803.

~~Scientific Apparatus Makers Assoc., 1101 16th Street, NW, Washington, DC 20036~~ **Laboratory Products Association, P.O. Box 428, Fairfax, VA 22038** .

University of Colorado, Natural Hazards and Information Applications Center, Disaster Research Clearinghouse, www.colorado.edu/hazards.

University of Delaware, Disaster Research Center, http:// ~~www~~ **drc** .udel.edu/ ~~DRC/~~ .

American Society for Healthcare Engineering (www.ashe.org), 155 North Wacker Drive, ~~Chicago~~ **Suite 400 ,** Chicago, IL 60606.

D.2.5 Addresses of Organizations and Agencies That Provide Health Care Emergency Preparedness Educational Materials.

D.2.5.1 Publications.

National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.

American Health Care Association, 1201 L Street **N.W.** , Washington, DC 20005.

American Hospital Association, 155 N. Wacker Drive, Suite 400, Chicago, IL 60606.

American Medical Association, ~~515 N. State Street,~~ **AMA Plaza, 330 North Wabash Ave., Suite 39300,** **Chicago, IL** ~~60610~~ **60611-5885** .

American Nurses' Association, 8515 Georgia Avenue, Suite 400, Silver Spring, MD 20910.

American Red Cross, National Headquarters, 2025 E Street, NW, Washington, DC 20006.

Family Disaster Planning http://www.redcross.org/services/disaster/beprepared/familyplan.html

Disaster Preparedness for People with Disabilities, http://www.redcross.org/services/disaster/beprepared/disability.html

Association of American Railroads, 50 F Street, Washington, DC 20001-1564.

Charles C. Thomas Publisher, 2600 South First Street, Springfield, IL 62704.

Dun-Donnelley Publishing Corp., 666 Fifth Avenue, New York, NY 10019.

Federal Emergency Management Agency, 500 C Street, SW, Washington, DC 20472.

Florida Health Care Association, 307 W. Park Avenue, P.O. Box 1459, Tallahassee, FL 32301.

Helicopter Association International, ~~1635 Prince Street~~ **1920 Ballenger Avenue** , Alexandria, VA 22314-~~2818~~ **2898** .

Hospital Emergency Incident Command System, State of California Emergency Medical Services Authority, 1930 9th Street, Sacramento, CA 95814. http://www.emsa.ca.gov/dms2/heics3.htm

International Association of Fire Chiefs, 4025 Fair Ridge Drive, Suite 300, Fairfax, VA 22033-2868.

Joint Commission on Accreditation of Healthcare Organizations (JCAHO), One Renaissance Blvd., Oakbrook Terrace, IL 60181.

National Interagency Incident Management System, Incident Command System, National Interagency Fire Coordination Center, Boise, ID. http://www.nwcg.gov/pms/forms/ics_cours/ics_courses.htm

Pan American Health Organization, 525 23rd Street, NW, Washington, DC 20037 (Attn.: Editor, Disaster Preparedness in the Americas).

Standardized Emergency Management System, State of California Governor's Office of Emergency Services, 3650 Schreiber Avenue, Mather, CA 95655. http://www.oes.ca.gov/Operational/OESHome.nsf/Content /B4943535210895448825 6C2A0071E038?OpenDocument

University of Delaware, Disaster Research Center (Publications), Newark, DE 19716.

U.S. Department of Transportation (available from U.S. ~~Government Printing~~ Government **Publishing** Office, Washington, DC 20402).

D.2.5.2 Audiovisual Materials.

National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.

Abbott Laboratories, Audiovisual Services, 565 Fifth Avenue, New York, NY 10017.

Brose Productions, Inc., 10850 Riverside Drive, N. Hollywood, CA 91602.

Federal Emergency Management Agency, Office of Public Affairs, Washington, DC 20472.

Fire Prevention Through Films, Inc., P.O. Box 11, Newton Highlands, MA 02161.

General Services Administration, National Audiovisual Center, Reference Section, Washington, DC 20409.

Helicopter Association International, ~~1635 Prince Street~~ **1920 Ballenger Avenue** , Alexandria, VA 22314-~~2818~~ **2898** .

Pyramid, P.O. Box 1048, Santa Monica, CA 90406.

University of Illinois Medical Center, Circle Campus, Chicago, IL 60612.

D.2.6 Additional U.S. Government Informational Sources.

Kidney Community Emergency Response Coalition, www.kcercoalition.com

Health Professional Predisaster Identification (ESAR-VHP), www.phe.gov/esarvhp

Hospital Available Beds for Emergencies and Disasters HAvBED, havbedhhs.gov

National Response Framework, www.fema.gov/national-response-framework

National Recovery Framework, www.fema.gov/recovery-framework

Department of Health and Human Services, ASPR National Health Security Strategy, http://www.phe.gov/Preparedness/planning/authority/nhss/Pages/default.aspx

Department of Health and Human Services, ASPR Hospital Preparedness Program, http://www.phe.gov/preparedness/planning/hpp/pages/default.aspx

U.S. ~~Government Printing~~ Government **Publishing** Office, Washington, DC 20402.

Biological Threat Interrogatories, http://www.va.gov/emshg/page.cfm?ID=BioThreatInterr.

Title 29, Code of Federal Regulations, Part 1910, Subpart 1030, *Bloodborne Pathogens*.

Title 29, Code of Federal Regulations, Part 910, Subpart 1910, *Occupational Exposures to Chemical Laboratories*.

Title 49, Code of Federal Regulations, Parts 171 through 190 (U.S. Dept. of Transportation, Specifications for Transportation of Explosives and Dangerous Articles). (In Canada, the regulations of the Board of Transport Commissioners, Union Station, Ottawa, Canada, apply.)

Title 49, Code of Federal Regulations, Part 173, *Shippers — General Requirements for Shipments and Packagings*.

Commercial Standard 223-59, *Casters, Wheels, and Glides for Hospital Equipment*.

Environmental Protection Agency, Chemical Emergency Preparedness and Prevention, http://yosemite.epa.gov/oswer/ceppoweb.nsf/content/homelandSecurity.htm?OpenDocument.

National Research Council Publication 1132, *Diesel Engines for Use with Generators to Supply Emergency and Short Term Electric Power*. (Also available as Order No. O.P.52870 from University Microfilms, P.O. Box 1366, Ann Arbor, MI 48106.)

U.S. Department of Defense:

U.S. Army Medical Research Institute of Chemical Defense (USAMRICD), http://chemdef.apgea.army.mil/.

U.S. Army Medical Research Institute of Infectious Diseases (USAMRIID), http://www.usamriid.army.mil/general/index.html.

U.S. Army Soldier and Biological Chemical Command (SBCCOM), http://hld.sbccom.army.mil/ip/detectors.

U.S. Department of Health and Human Services:

Centers for Disease Control and Prevention: HHS Publication No. 93–8395, *Biosafety in Microbiological and Biomedical Laboratories*.

Centers for Disease Control and Prevention, Public Health Preparedness and Response for Bioterrorism Program, http://www.bt.cdc.gov/planning/continuationguidance/index.asp.

National Institute for Occupational Health and Safety, Personal Protection Equipment, http://www.cdc.gov/niosh/topics/emres/ppe.html.

Protecting Building Environments from Airborne Chemical, Biologic and Radiologic Agents (page 9). http://www.cdc.gov/mmwr/PDF/wk/mm5135.pdf.

U.S. Department of Homeland Security:

Capability Assessment for Readiness, http://www.fema.gov/pdf/rrr/car.pdf.

Exercise Design Course, http://training.fema.gov/emiweb/IS/is120.asp.

Guide for All-Hazard Emergency Operations Planning, http://www.fema.gov/pdf/rrr/slg101.pdf.

Metropolitan Medical Response System, Resources, http://mmrs.hhs.gov/main/Resources.aspx.

National Disaster Medical System, Conference Library, http://ndms.dhhs.gov/NDMS%20Conference/conf2k3/previous_confe_03/previous_confe_03.html.

Strategic National Stockpile, http://www.bt.cdc.gov/stockpile/index.asp.

U.S. Department of Justice, Office of Domestic Preparedness, Publications Library, http://www.ojp.usdoj.gov/odp/library/bulletins.htm.

U.S. Department of Labor, Occupational Health and Safety Administration, Washington, DC:

Title 29, Code of Federal Regulations, Part 1910: *Employee Protection Plans*, 1910.38; Subpart H, *Hazardous Materials* (1910.101-126), specifically 1910.120, *Hazardous Waste Operations and Emergency Response* (HAZWOPER) and Appendices A-E; Subpart I, *Personal Protective Equipment* (1910.132-139 and Appendix B), specifically: 1910.132, *General Provisions*; 1910.133, *Eye and Face Protection*; 1910.134, *Respiratory Protection* (and Appendices A-D); 1910.136, *Occupational Foot Protection*; 1910.138, *Hand Protection*; Subpart Z - *Toxic and Hazardous Substances* (1910.1000-1450 and Appendix B), specifically 1910.1200–*Hazard Communication* (and Appendices A-E).

Publication 3114, *Hazardous Waste Operations and Emergency Response*, http://www.osha.gov/Publications/OSHA3114/osha3114.html.

Publication 3152, *Hospitals and Community Emergency Response – What You Need to Know*, http://www.osha.gov/Publications/OSHA3152/osha3152.html.

D.2.7 Additional Resources for Emergency Management.

Emergency Management Principles and Practices for Health Care Systems, Institute of Crisis, Disaster and Risk Management, The George Washington University, Washington, DC, 2010, for the Veterans Health Administration, Principal Investigator Joseph Barbera, MD; http://www.gwu.edu/~icdrm/publications/index.html#books.

D.2.8 Other Publications.

DuPont Safety News, June 14, 1965.

Dasler and Bauer, Ind. Eng. Chem. Anal., Ed. 18, 52 (1964).

Hoeltge, G. A., Miller, A., Klein, B. R., Hamlin, W. B., *Accidental fires in clinical laboratories*.

ISO/IEC 31010, *Risk Management — Risk Assessment Techniques*, 2009.

SEMI S10-0307E, *Safety Guideline for Risk Assessment and Risk Evaluation Process*.

Statement of Problem and Substantiation for Public Input

Updated National organization addresses.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 5-NFPA 99-2015 [Global Input]	
Public Input No. 6-NFPA 99-2015 [Section No. 2.3]	Referenced current SDO names, addresses, standard names, numbers, and editions.
Public Input No. 7-NFPA 99-2015 [Section No. D.1.2]	Referenced current SDO names, addresses, standard names, numbers, and editions.

Submitter Information Verification

Submitter Full Name: Aaron Adamczyk
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Sat Mar 21 17:33:29 EDT 2015

Committee Statement

Resolution: See First Revision No. 102
Statement: Annex D referenced documents have been updated to show the most current editions.

Public Input No. 490-NFPA 99-2015 [New Section after D.2.3]

D.2.3.1 Reference Material for 14.2.8.3.19

Workman, W.T. (1999). *Hyperbaric Facility Safety: A Practical Guide,* Section VI Chapter 4 (p. 675). Flagstaff (AZ): Best Publishing.

Burman, F. (2015). *Risk Assessment Guide for the Installation and Operation of Clinical Hyperbaric Facilities* ; 5th edition, revised 2015. San Antonio (TX): International ATMO.

Burman, F., Sheffield, R., Posey, K. (2009). *Decision Process to Assess Medical Equipment for Hyperbaric Use* ; UHM 2009, Vol. 36, No. 2, Undersea and Hyperbaric Medical Society, Inc.

Statement of Problem and Substantiation for Public Input

Reference material for guidance on risk assessment of electrical devices used in a Class A clinical hyperbaric chamber.

Submitter Information Verification

Submitter Full Name: WILLIAM GOSSETT
Organization: CONVERGENT, LLC
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 16:34:20 EDT 2015

Committee Statement

Resolution: See First Revision No. 102
Statement: Annex D referenced documents have been updated to show the most current editions.

Public Input No. 488-NFPA 99-2015 [Section No. D.2.3]

D.2.3 References for A.14.3.1.5.4.3.

NASA BMS Document GRC-M8300.001. (2005). Ch. 5, Para. 5.6.3.

Raleigh, G., et al. (2005). *Air-Activated Chemical Warming Devices: Effects of Oxygen and Pressure*. Undersea Hyper Med, 32(6).

Workman, W.T. (1999). *Hyperbaric Facility Safety: A Practical Guide* (p. 531). Flagstaff (AZ): Best Publishing.

Kindwall, E.P., & Whelan, H.T. (2004). *Hyperbaric Medicine Practice* (p. 86). Flagstaff (AZ): Best Publishing.

Burman, F. (~~2006~~ 2015). *Risk Assessment Guide for the Installation and Operation of Clinical Hyperbaric Facilities*; ~~4th~~ 5th edition, revised 2015 edition . San Antonio (TX): International ATMO.

Statement of Problem and Substantiation for Public Input

Updated information.

Submitter Information Verification

Submitter Full Name: WILLIAM GOSSETT
Organization: CONVERGENT, LLC
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 06 16:32:40 EDT 2015

Committee Statement

Resolution: See First Revision No. 102
Statement: Annex D referenced documents have been updated to show the most current editions.